Cedar Creek Subwatershed Environmental Assessment

EA OR125-99-19

November 7, 2000

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Chapter 1 - Purpose and Need for Action

The Bureau of Land Management (BLM) proposes to implement Regeneration Harvest and Commercial Thinning activities in the Cedar Creek Subwatershed. The analysis area is approximately 26 miles southeast of Coos Bay, Oregon. It includes the Arrow Creek, Lower Cedar Creek, Upper Cedar Creek, Middle Williams River, and Goose Gulch drainages that are tributary to South Fork Coos River. The total analysis area is 34,773 acres in size. The BLM manages 3,437 acres (10%) of the analysis area. The remaining lands are privately owned. The proposed harvest activities are located in Douglas County, T26S-R08W, T26S-R08W, T26S-R09W, T27S-R09W, Willamette Meridian.

After searching for stands available for harvest in the databases and field checking them, six project areas are being proposed. From the six project areas, 189 acres would be offered for final harvest and 906 acres would be commercially thinned.

The purpose of this Environmental Assessment (EA) is to analyze the effects of harvesting timber from this analysis area and actions associated with the timber sales. The proposed actions would contribute to the District's annual Allowable Sale Quantity (ASQ). The imperative for the BLM to offer O&C timber for sale is contained in Public law 43 USC Sec. 118 which states, "...Provided, that timber from said lands in an amount not less than one-half billion feet board measure, or not less than the annual sustained yield capacity when the same has been determined and declared, shall be sold annually, or so much thereof as can be sold at reasonable prices on a normal market." The volume contained within the harvest units could be sold as early as fiscal year 2001 and may be spread over several years.

Cedar Creek Subwatershed is included in the *South Fork Coos Watershed Analysis* (USDI BLM 2000), which is hereby incorporated by reference. The watershed analysis contains data, information, and recommendations which represents the current understanding of conditions and natural processes in the analysis area. It is not intended as a decision document and is used in the context of providing information to the Interdisciplinary Team to develop project alternatives and project design criteria. The proposed project areas are within the Matrix (General Forest Management Area (GFMA) and Connectivity) and Riparian Reserve(RR) Land Use Allocations as designated by the *Coos Bay District Resource Management Plan* and its Record of Decision (USDI BLM 1995). This Environmental Assessment (EA) OR125-99-19 addresses site specific, direct, indirect, and cumulative effects of this proposal.

This EA is tiered to the *Coos Bay District Resource Management Plan* and its Record of Decision (USDI BLM 1995); which is in conformance with the *Final Supplemental Environmental Impact Statement on Management of Habitat for Late Successional and Old Growth Forest Related Species Within the Range of the Northern Spotted Owl (Northwest Forest Plan)* and its Record of Decision (Interagency 1994). It is also tiered to the *Draft Supplemental Environmental Impact Statement For Amendment to the Survey and Manage, Protection Buffer, and Other Mitigating Measures Standards and Guidelines* (Interagency 1999).

This EA incorporates by reference the *South Coast _ Northern Klamath Late-Successional Reserve Assessment* (Interagency 1998); *Noxious Weed Strategy for Oregon/Washington* (USDI BLM 1994) and *Partners Against Weeds*, An Action Plan for the Bureau of Land Management (USDI BLM 1996); *Port-Orford-Cedar Management Guidelines* (USDI BLM 1994b); and the Western Oregon Transportation Management Objectives (USDI BLM 1996b). Actions described in this EA are designed to be in conformance with the Aquatic Conservation Strategy (ACS) Objectives listed on page B-11 and the Standards and Guidelines for Riparian Reserves on pages C-31 to C-37 of the *Northwest Forest Plan* (Interagency 1994).

The Analysis File contains additional information that was used by the Interdisciplinary Team (IDT) to analyze

impacts and alternatives and is hereby incorporated by reference.

All of the documents are available for review at the Coos Bay District Office of the BLM, during regular business hours. Some of these documents are available at the Coos Bay and North Bend Public Libraries, the Coos Bay District's Internet Home Page at *http://www.or.blm.gov/coosbay*, and the Oregon State Office of the BLM in Portland, Oregon.

Management Objectives

- Produce a sustainable supply of timber and other forest commodities to provide jobs and contribute to community stability.
- Work toward meeting the Coos Bay District's Allowable Sale Quantity (ASQ) for Fiscal Year 2000 and beyond as identified in the *Coos Bay District Resource Management Plan* and its Record of Decision (USDI BLM 1995) and the *Northwest Forest Plan* (Interagency 1994).
- Enhance the growth and vigor of the residual stand by removing and utilizing excess trees that would otherwise be lost to mortality due to high density of the stand and provide larger trees for future management objectives.
- Manage stand density within the Riparian Reserves to release understory conifers, increase the growth rate of the residual trees, stimulate the growth of other desirable vegetation, and increase the natural regeneration of conifer and hardwood species.
- Redirect the trajectory of stands in the Riparian Reserves so they will develop habitat characteristics beneficial for late-successional wildlife species, and thus provide refuge areas and recolonization source areas for the adjacent Matrix lands for the long term.
- Maintain habitat elements such as green retention trees, large down logs and snags to provide connectivity (along with other land use allocations such as Riparian Reserves) between Late-Successional Reserves.
- Provide for future development of late-successional habitat elements through the use of commercial thinning and density management.
- Work toward the goals established by the *Western Oregon Transportation Management Objectives* (USDI BLM 1996b) for the *South Fork Coos Watershed Analysis Area* (USDI BLM 1999).
- Meet Aquatic Conservation Strategy Objectives.
- Limit Port-Orford-cedar root rot disease (*Phytophthora lateralis*) spread in high risk areas (i.e. next to roads and in riparian areas) and maintain Port-Orford-cedar in low risk areas.
- Reduce existing road mileage within Key Watersheds.

Alternatives Considered But Eliminated from Further Analysis

Hardwood Conversion Stand

A Pacific madrone stand with scattered old growth Douglas-fir in T. 26S., R. 08W., Section 20 approximately 9 acres in size was included as a hardwood conversion area with the Proposed Action. The recommendation to convert this area was founded on this District's management objectives during the 1980s under the Management Framework Plan.

The *Coos Bay District Resource Management Plan* and its Record of Decision (USDI BLM 1995) page 28, directs interdisciplinary teams to identify special habitat areas and determine relevant values for protection or management on a case-by-case basis. This habitat type is not common across the federal ownership landscape and is not perpetuated on private industrial forest lands due to the emphasis on conifer production. At this time, the Interdisciplinary team has decided not to convert this area and recommends that the stand be allowed to follow it's natural successional course.

Road Decommissioning

Two roads to have been decommissioned that fall inside the project areas were identified in the *Western Oregon Transportation Management Objectives* (USDI BLM 1996b) process for the *South Fork Coos Watershed Analysis* (USDI BLM 1999). The roads are 26-8-17.00 and 26-8-21.00. These roads will not directly be used for timber sale operations. To decommission these roads using timber sale money would be inconsistent with existing laws and regulations. Bartering of government services is unlawful and unless the decommissioning of extra roads is required because the sale is located in a key watershed or required under the terms and conditions of a biological opinion, these roads will be decommissioned with appropriated funds.

Scoping

A scoping process to identify the agency and public concerns relating to the proposed projects has been conducted by the BLM to help define the issues and alternatives that would be examined in detail in the EA. The general public was informed of the planned EA through letters to those on the Resource Area's mailing list, those receiving the Coos Bay District's *Planning Update*, and through the District's Internet site. The scoping letter, mailing list, and public responses are in the Analysis File.

List of Agencies and Individuals Contacted

The general public was notified of the planned EA through the publication of Coos Bay District's semi-annual *Planning Update*.

All proposed projects in this EA will be reviewed by the U.S. Fish and Wildlife Service and National Marine Fisheries Service through the consutation process provided under section 7(A)(4) of the Endangered Species Act of 1973.

The following adjacent landowners were contacted verbally, informing them of the proposed projects:

Weyerhauser Timberlands, Coos Bay, OR

Scoping letters were mailed or e-mailed to:

Confederated Tribes of Siletz
Oregon Department of Agriculture, Noxious Weed Control Program
Water Resources Department
Native Plant Society of Oregon
Southern Oregon Timber Industries Association
Division of State Lands
USDI Bureau of Indian Affars
Oregon Department of Fish and Wildlife
Ron Yockim
John Griffith
Oregon Natural Resources Council
NOAA National Marine Fisheries Service

Governors Natural Resources Office
State Historic Preservation Office
Association of O&C Counties
Donald Fontenot
Cindy Soderholm
Confederated Tribes of the Coos, Lower Umpqua, and Siuslaw Indians
Umpqua Watersheds, Inc.
Department of Land Conservation and Development
Sierra Club, Many Rivers Group
Oregon Department of Environmental Quality
Douglas County Board of Commissioners
Kalmiopsis Audubon Society
Rogue Forest Protective Association
Klamath-Siskiyou Wildland Center
Department of Forestry
Pam Hewitt, Many Rivers Group
Hugh Kern

Scoping for Green Cedar Regeneration Harvest was 45 days, from Friday, June 11, 1999 to Monday, July 26, 1999. Subsequently, the scope of the proposed projects and the analysis area changed warranting a new scoping which was scheduled for 20 days, from April 24, 2000 to May 13, 2000. The closing date for this second scoping was extended to accomodate two trips to the proposed project areas to provide access to interested members of the public. The two trips took place on Tuesday, June 20, 2000 and Thursday, July 6, 2000. The new closing date for the scoping period was Friday, July 28, 2000.

Proposed Project Areas A, B, C, D, and E are all interior to Weyerhauser's Millacoma Tree Farm. The United States has acquired access from the landowner through a reciprocal right-of-way agreement subject to the O&C Right-of-Way Regulations (43 CFR 2812).

Under the O&C Right-of-Way Regulations (43 CFR 2812), the United States obtatins rights over private roads and lands to reach public lands for the purposes of management and/ or removal of forest products. These rights apply to roads owned or controlled by the permittee and roads constructed by the United States on permittee lands. These rights are available for use by the United States and its licensees and exclude access for the general public.

Because of legal and safety considerations, when access to a sale area involves a reciprocal right-of-way agreement, the general public should be informed of the access situation. When necessary, District offices could arrange for BLM escorted tours on an as-needed or scheduled basis to ensure the safety and conduct of visitors and provide an opportunity for public comment and participation.

In the case of an advertised timber sale, access rights obtained by the government are extended to prospective bidders for purposes of examining the advertised sale. They cannot be extended to other members of the general public. For access purposes, a "prospective bidder" is defined as a past purchaser of federal timber. Prospective bidders who have not previously purchased federal timber must be able to demonstrate, to the satisfaction of the Authorized Officer, that they have the technical and financial capacity to execute and complete a BLM timber sale contract. (BLM Instruction Memorandum No. OR-96-057, Dated March 11, 1996)

List of Scoping Respondents

Peter MacAusland
David and Christine Masters, Umpqua Watersheds, Inc.
Rhoda Verkuyl
Alex Brown, Oregon Natural Resources Council
Dean Hinton
David Hill, Southern Oregon Timber Industries Association
Joe Serres, Klamath-Siskiyou Wildlands Center
Griffith Davies
Kevin Collins
Joseph Vaile, Klamath-Siskiyou Wildland Center
Francis Eatherington, Umpqua Watersheds, Inc.
Nicole Czarmonski, Oregon Natural Resources Council

Chapter 2 - Alternatives Including the Proposed Action

This chapter describes the proposed actions for six proposed project areas (A through F) in Cedar Creek Subwatershed and alternatives.

No Action Alternative
Under the No Action Alternative, no forest management activities would occur at these specific locations. Since no volume would be produced from the analysis area to meet the District's ASQ, other areas would be proposed for forest management activities to meet the objectives of the Matrix as detailed in the *Coos Bay District Resource Management Plan* and its Record of Decision (USDI BLM 1995).

Proposed Action
Under the Proposed Action all Proposed Project Areas would be harvested in the current decade. Tables One through Six describe the actions.

Table One: Proposed Project Areas

Project Area	Location	Land Use Allocation	Proposed Action	Harvest Method	Acres	Volume/Acre Harvested	Total Volume Harvested
A	26-8-10	GFMA	Regeneration Harvest	Cable	20	49mbf/acre	980mbf
B	26-8-22	GFMA	Regeneration Harvest	Cable/ Aerial	104	50mbf/acre	5200mbf
C	26-8-20	Connectivity	Regeneration Harvest	Cable/ Aerial	34	45mbf/acre	1530mbf
			Commercial Thinning	Cable	41	16mbf/acre	656mbf
D	26-9-14	Connectivity	Regeneration Harvest	Cable/ Aerial	18	50mbf/acre	900mbf
E	26-8-32	GFMA	Regeneration Harvest	Cable	13	40mbf/acre	520mbf
F	27-9-10, 14, 15	GFMA	Commercial Thinning	Ground/ Cable/ Aerial	865	5mbf/acre	4325mbf
Total					1095		14.1mmbf

Table Two: Acres by Harvest Method

Project Area	Ground Based (Acres)	Cable (Acres)	Aerial (Acres)	Total
A		20		20
B		55	49	104
C		34*		75
		41		
D		18*		18
E		13		13
F	174	564	127	865
Total	174	745	176	1,095

*These areas will be chosen after any required surveys are completed. Placement of the units will be determined by the location of any reserve areas.

Table Three: Roads by Project Area

Project Area	New Construction (ft)		Improvement of Inventoried Dirt Spurs (ft)		Improvement of Uninventoried Dirt Spurs (ft)		Renovation (ft)		Total (ft)		
	BLM	Private	BLM	Private	BLM	Private	BLM	Private	BLM	Private	All
A		200						1,500		1,700	
B	1,300						1,200	12,800	2,500	12,800	15,300
C	1,200						3,200	11,300	4,400	11,300	15,700
D		500		3,600				5,800		9,900	9,900
E	100	800						1,100	100	1,900	2,000
F	6,000		9,500		9,200	100	1,300		26,000	100	26,100
Subtotal	8,600	1,500	9,500	3,600	9,200	100	5,700	32,500	33,000	37,700	70,700
Total	10,100		13,100		9,300		38,200		70,700		

Table Four: New Construction by Project Area

Project Area	Spur Number	Road Length (ft)		Category	Surface Type
		BLM	Private		
A	1		200	Temporary	Dirt
B	1	800		Temporary	Dirt
	2	300		Temporary	Dirt
	3	200		Temporary	Dirt
C	1	1,200		Temporary	Dirt
D	1		500	Temporary	Dirt
E	1	100	800	Temporary	Dirt
F	3	1,400		Semi-Permanent	Rock
	5	1,100		Semi-Permanent	Rock
	7	700		Semi-Permanent	Rock
	14	900		Semi-Permanent	Rock
	15	200		Semi-Permanent	Rock
	16	1,000		Semi-Permanent	Rock
	17	300		Semi-Permanent	Rock
	19	400		Temporary	Dirt

Table Five: Existing Roads to be Decommissioned (Restored to Pre-Road Hydrologic Function) by Project Area*

Project Area	Road Number	Length (ft)	Timing of Closure	Remarks
A	26-8-11.03	1,100	After Harvest Operations	
B	26-10-27.02	1,700	After Site Preparation	
C	26-8-19.00	3,600	After Site Preparation	On BLM Only
	26-8-20.00	2,200	After Harvest Operations	On BLM Only
	26-8-20.01	900	After Harvest Operations	On BLM Only
F	27-9-14.00	2,700	After Harvest Operations	
Total		12,200		

*Roads identified in the *Western Oregon Transportation Management Objectives* (USDI BLM 1996b) process for the *South Fork Coos Watershed Analysis* (USDI BLM 1999).

Table Six: Comparison of New Construction to Closures

Project Area	New Construction (ft)	-	New Construction Closed (ft)	-	Additional Closures (ft)	'	Net Decrease (ft)
A	200		200		1,100		-1,100
B	1,300		1,300		1,700		-1,700
C	1,200		1,200		6,700		-6,700
D	500		500		0		0
E	900		900		0		0
F	6,000		6,000		2,700		-2,700
Total	10,100	-	10,100	-	12,200	'	-12,200

Connectivity/ Diversity Blocks

In the Matrix Land Use Allocation, there are approximately 19,000 acres in General Forest Management Area and 2,000 acres in the Connectivity/ Diversity Blocks over the Umpqua Field Office. Connectivity/ Diversity Blocks vary in size and are distributed throughout the Matrix. Each of these areas are managed to maintain 25 to 30 percent of the forested acres in late-successional forest at any point in time. Riparian Reserves and other allocations with late-successional forest are included in this percentage. Silvicultural systems in the Connectivity/ Diversity blocks will be designed to promote development of late-successional forest structure within a longer rotation, while providing an output of merchantable timber and maintaining forest health and productivity. All treatments will be conducted in a manner that reduces impacts to the animal species present while still allowing the harvest to occur. Lands available for harvest will be managed generally as even-aged stands with substantial overstories of larger trees. Project Areas C and D are in Connectivity/ Diversity Blocks 18 and 20, respectively.

Regeneration harvests on available forest lands in the Connectivity/ Diversity blocks will be planned for a 150-year control rotation. This means that regeneration harvest will occur at a rate of approximately 1/15 of the available acres per decade. Because of the limited size of operable areas within any given block, up to three decades of harvest could be removed at any one time from a single block to make a viable harvest unit.

Stands approximately 30 to 110 years of age will be considered for density management thinnings. The purposes of density management may include one or more of the following: to accelerate growth of trees which will later provide large-diameter snags and down logs; to promote development of understory vegetation and multiple canopy layers; to produce larger, more valuable logs; to harvest mortality of small trees as the stand develops; to maintain good crown ratios and stable, windfirm trees; and to manage species composition.

Roads

The calculated road densities for Cedar Creek Subwatershed from *South Fork Coos Watershed Analysis* (USDI BLM 1999) are 3.1 miles per section. Cedar Creek Subwatershed is in the Oregon Department of Fish and Wildlife's Tioga Big Game Management Unit identified for the management of Roosevelt Elk. The goal within this area as directed by the *Coos Bay District Resource Management Plan* and its Record of Decision (USDI BLM 1995) is to maintain 1.1 miles of open road per section per watershed with a maximum density of 2.9 miles of open road per section. As stated in the Project Design Features of this Environmental Assessment, all newly constructed roads associated with this action will be closed after completion of the project. Also see Table Five for other roads that will be closed along with these projects. There will be a net decrease in road density after all actions covered by this analysis are complete.

Seventy-Four acres of Project area F drains into the Tier 1 Key Watershed, Tioga Creek. One of the goals for Tier 1 Key Watersheds is to reduce road Mileage. The 400 feet of new construction for Spur 19 is temporary.

Design Features Specific to Project Areas

For all Project Areas, see Tables One through Six above.

Project Area B

Table Seven: Units in Project Area B

Unit #	Acres	Volume/Acre	Total Volume	Harvest Method
1	14	50mbf/acre	700mbf	Cable
2	2	40mbf/acre	80mbf	Cable
3	45	50mbf/acre	2250mbf	Cable/ Aerial
4	2	60mbf/acre	120mbf	Aerial
5	9	55mbf/acre	495mbf	Aerial
6	32	50mbf/acre	1600mbf	Cable/ Aerial
Total	104		5.2mmbf	

Project Area C

Regeneration Harvest

Regeneration harvest calculation for Connectivity/ Diversity block 18, T. 26S., R. 08W., Section 20:

Forested Acres in Connectivity/ Diversity block 18	= 438 acres
25% of Forested Acres	= 110 acres
80 years +	= 282 acres
80 years + Available for Consideration	= 172 acres
1/5 of the Available Area (172 acres)	= 34 acres

Out of the 172 acres available for harvest consideration in this block, 34 acres will be chosen after all required Survey and Manage, Protection Buffer, and Threatened and Endangered species monitoring has been completed.

Commercial Thinning

Table Eight: Commercial Thinning Prescription for Project Area C

Criterion	Before	After (presented as a range)	
Trees per Acre (tpa)	160tpa	60	80
Average Spacing (feet)	16.5 x 16.5	27 x 27	23 x 23
Average Volume per Acre (board feet)	65,025bf/acre	49,046bf/acre	
Crown Closure (%)	90%	65%	70%
Basal Area per Acre (square feet)	296	215	
Stand Ages	67, 97, 60, 45 (from increment boring)		

The stand will be thinned from below (removal of suppressed, intermediated, and some codominant).

Project Area D

Regeneration harvest calculation for Connectivity/ Diversity block 20, T. 26S., R. 09W., Section 12 and 14:

Forested Acres in Connectivity/ Diversity block 20	= 335 acres
25% of Forested Acres	= 84 acres
80 years +	= 175 acres
80 years + Available for Consideration	= 91 acres
1/5 of the Available Area (91 acres)	= 18 acres

Out of the 91 acres available in this block, 18 acres will be selected after all required Survey and Manage, Protection Buffer, and Threatened and Endangered species monitoring has been completed.

Project Area F

Harvest Area = 865 acres
Approximately 198 acres thinning in Riparian Reserves.

50' No Touch Buffer	= 14 acres
20' No Touch Buffer	= 55 acres
Total	= 69 acres

Total Riparian Reserve	= 267 acres	
Riparian Reserve Thinned	= 198 acres	74%
Riparian Reserve Unthinned	= 69 acres	26%

- The stand will be thinned from below (removal of suppressed, intermediate, and some codominant) to approximately 120 to 150 trees per acre.

- The 27-9-14.0 Road will be improved during the dry season.

Project Design Features Common to All Project Areas

Roads

- All newly constructed roads will be temporary or semi-permanent. Temporary roads will have dirt surface and be built and decommissioned in the same season. Semi-permanent roads will be open for more than one season of use and decommissioned after site preparation has been completed. All roads will be constructed to minimize soil erosion.
- All new road construction will be on ridgetops or near ridgetops on moderate slopes.
- Road related work with the potential to effect Special Status fish species will be performed during the dry season. Specifically the 27-9-14.0 road.
- Road maintenance would be performed during the life of the sale to minimize erosion potential.
- All dirt surfaced roads to be closed will be scarified to a depth deep enough to allow grass seed to catch and remain on the road surface. Water bars will be placed fifty feet apart on steeper grades, and close enough on the flatter grades to reduce the accumulations of water. All cuts and fills, as well as the road surface, will be seeded, mulched and fertilized following completion of yarding operations.
- All cuts and fills on decommissioned roads will be planted with Douglas-fir seedlings after the sale has been returned to BLM.
- Elk Wallow, Buck Peak and Burnt Mountain Quarries will be used for sandstone base rock for roads. Extraction of material from these quarries was analyzed in the *Coos Bay District Resource Management Plan* and its Record of Decision (USDI BLM 1995).
- All potentially unstable material overhanging the edges of landings will be pulled back and landings reshaped.
- After road and landing construction is complete, all bare soil areas on road cuts, fills, and landing areas will be grass seeded with native grass seed or approved BLM mix and mulched. All roads to be closed will have culverts pulled to ensure pre-road hydrologic function and will be blocked to any motorized vehicle passage.
- Sediment filters will be placed at culvert locations specified by the BLM hydrologist where haul generated sediment delivery to fish-bearing streams of any significance is likely to occur from roads during the rainy season (generally mid-October to mid-May). Once haul is completed, sediment retained by the filters would be transported to upland locations to prevent subsequent delivery to aquatic resources.

Solid and Hazardous Waste

- The timber sale contract will contain provisions for compliance with the State of Oregon Department of Environmental Quality (ODEQ 1998) and Oregon Department of Forestry *Forest Practices* (ODF 1998) guidelines for spill response and containment. Site monitoring for solid and hazardous waste will be performed during all operations in conjunction with normal contract administration. Any spills or releases resulting from operations shall be subject to the *Coos Bay District Hazardous Materials Management Contingency Plan* (USDI BLM 1997). Post-harvest road closures will reduce the potential access to sites for illegal dumping. Hazardous material reportable quantities are defined in ORS Chapter 4661, Hazardous Waste and Hazardous Materials 466.605 to 466.680.

Falling

- Directional felling will be required away from property lines and reserve areas, which include special habitat areas, previous sale areas, Riparian Reserves, riparian no-cut zones, and wildlife trees and snags as safety permits.

- To the extent possible, existing snags will be reserved from felling unless there are safety concerns.

T&E, S&M, Special Status, and Protection Buffer Species

- Prior to any ground disturbing activities, required surveys will be done to protocol.

- If Threatened or Endangered, Survey and Manage, Special Status, or Protection Buffer plant, animal or fish species, also those wildlife species listed in the BLM State Office Memo OR-96-78 and those listed in the *Coos Bay District Resource Management Plan* and its Record of Decision are found in the sale units, management guidelines for the species will be implemented.

- In accordance with Section 7(a) of the Endangered Species Act of 1973 as amended, the Proposed Action has been referred for consultation where appropriate to the U.S. National Marine Fisheries Service and the U.S. Fish and Wildlife Service to seek concurrence with the recommended determinations.

Noxious Weeds

- Noxious weeds, on existing roads and proposed new construction, will be treated (manually, mechanically, or chemically) prior to road construction or harvest activities. If harvest activities occur over multiple years, follow-up treatments may be needed. Treatments will allow for safe vehicle use while limiting contact with weeds and seeds. Where possible, retain shade and minimize disturbance of existing seed beds and soil.

- All grass seed used to prevent erosion, prevent weed establishment or meet other needs will be certified weed free native grasses, if available, or the District's standard seed mix and mulched with weed free mulch.

Port-Orford-cedar Root Rot

- To help prevent the introduction and spread of noxious weeds and Port-Orford-cedar root disease (*Phytophthora lateralis*), equipment will be washed prior to entering contract areas during the contract period, and are required to stay within road right-of-ways, except when needed for guyline trees. Only equipment specifically designated to operate within units (ex. mechanical harvesters) are allowed off of road right-of-ways.

- All Port-Orford-cedar within new or existing landings and road right-of-ways (top of the cut bank and bottom of fill or 25' uphill and 30' downhill, whichever is greater) are to be removed. Stumps should be less than 6" tall with no live limbs attached. Seedlings must be grubbed or burned with a propane or kerosene torch. Also, Port-Orford-cedar greater than 7" in diameter-at-breast-height within 50' of road shoulders or ditches are to be removed to reduce seed source. Approval to haul should not be given until Port-Orford-cedar root rot sanitation occurs.

- Only healthy Port-Orford-cedar greater than 50' from infected sites, and roads or streams are suitable for retention. Cut or girdle visibly infected Port-Orford-cedar, and nearby (Less than 50') green Port-Orford-cedar. Space individuals and groupings of Port-Orford-cedar 50' apart to reduce potential of Port-Orford-cedar root disease spread and root grafting.

- Consider planting 1-5% Port-Orford-cedar (genetically resistant if available) on a wide spacing outside of infection sites, and away from roads and streams. Burning (spot or broadcast) infected areas and planting

species other than Port-Orford-cedar is effective.

- If feasible, road building, surfacing, ground based yarding, and log hauling with the potential to transmit *Phytophtera lateralis* should be restricted to the dry season. If feasible, roads should be out-sloped, surfaced with crushed rock, and placement of culverts and water bars should avoid Port-Orford-cedar. Divert water away from Port-Orford-cedar areas.

- BLM shall request permission from private road owners, under the conditions of use request, to treat noxious weeds and Port-Orford-cedar (per above stipulations or as allowed by the owners).

Cultural Resources

- Buffers will be established to maintain the integrity of each cultural resource site.

- If any important cultural materials are encountered during the project, all work in the vicinity will stop and the District Archaeologist will be notified at once. Native American Grave Protection and Repatriation Act notification requirements will be followed if appropriate (NAGPRA 1997).

Project Design Features Common to Regeneration Harvest Areas

Harvest Systems and Design

- Pertaining to the areas harvested with a cable system, full log suspension will be required over streams. Full or partial suspension will be required over all areas inside the units where possible.

- The location, number, and width of yarding corridors through Riparian Reserves will be specified prior to yarding. Natural openings will be used as much as possible. Not more than 250 feet of yarding corridors will be allowed within any 1000 feet of stream. Maximum corridor width will be 50 feet, and corridors will be at least 50 feet apart.

Green Retention Trees

- Six to eight green conifer trees per acre will be retained in all Regeneration Harvests occurring on the General Forest Land Management Land Use Allocation. Twelve to Eighteen green conifer trees per acre will be retained in all Regeneration Harvests occurring in the Connectivity/ Diversity Blocks. Retained trees will be distributed in variable patterns to contribute to stand diversity.

Coarse Woody Material

- An average of 120 linear feet of decay class 1 and 2 logs per acre will be retained over the cutting area, reflecting the species mix of the project area, in Regeneration Harvests. Generally, all logs will be at least 16 inches in diameter at the large end, and 16 feet in length except that shorter pieces will be credited on a cubic foot basis in accordance with I.B. No. OR-97-064. In Project Areas A, B, C and E the coarse woody material requirement will be accounted for in standing trees with additional green retention trees per acre to be felled after site preparation. In Project Area D the material will be left on site at the time of harvest. Trees and logs will be distributed throughout the cutting area, and not piled or concentrated in a few areas. All decay class 3, 4, and 5 logs will be retained on site.

Riparian Reserves

- In accordance with the *Coos Bay District Resource Management Plan* and its Record of Decision (USDI BLM 1995), Riparian Reserves will be maintained to protect intermittent, fish-bearing, perennial fish-bearing streams, and natural ponds, as well as potentially unstable areas within the proposed project areas. Riparian Reserve widths would be equal to the distance of two site-potential tree heights (440 feet) on each

side of fish bearing streams and natural ponds(including the body of water), and one site-potential tree height (220 feet) on each side for non-fish-bearing perennial streams and intermittent streams.

Site Preparation and Fuels

- Post harvest, cut all brush greater than 2 feet tall, hardwoods less than 8 inches in diameter at breast height, and all damaged conifer reproduction outside of all reserve and retention areas.
- Project areas with boundaries, reserve areas, and retention areas which are placed in such a way as to be defendable in a controlled fire situation and which have sufficient access for crews, equipment and adequate nearby water resources for holding and mop up operations, will be broadcast burned under spring like conditions. Construct hand fire lines with water bars on the exterior of unit boundaries. 100% mop up of burned areas will be required. Water used for mop up will be drawn from water holes which are located on and maintained by private landowners. Permits for the use of the water sources will be obtained from the private landowners.

- For burning purposes, to the extent possible, locate green retention trees in clumps near unit boundaries, on bench-like areas away from topographical breaks or at the toe of steep slopes. Retention trees should be sound and if possible free of bole damage such as cat faces, within the first 10 feet. If bole damage is found within the lower 10 feet, it should be located on the uphill side of the tree.

- For project areas A, B, C & E, reserved coarse wood will be accounted for in standing volume, no throwback from coarse wood is necessary. In project area D, if broadcast burning is prescribed, a 10 foot slash pullback away from decay class 1 and 2 coarse woody material will be used. Where possible, locate reserved coarse woody material within wildlife tree clumps, Survey and Manage buffers, benched areas, away from edges of topographical breaks and at the toe of steep slopes.

- Project areas with poor access, boundaries and/or Survey and Manage buffer sites which are located in areas difficult to keep fire out of and which pose a high risk of escape should be treated with alternative methods such as hand or machine piling.

- Machine pile accessible sites in the late summer (August 1 to September 15 or on slopes that are from 0 to 30% with a maximum soil moisture of 30% and slopes from 30 to 35% with a maximum soil moisture of 25% as approved by the Authorized Officer) using a hydraulic excavator with a “Brush” type attachment for piling. Cover with plastic and burn all piles in late fall or winter. Locate piles at least 15 feet from reserved coarse woody material, snags and wildlife trees. Avoid making frequent passes over the same area. If necessary, at the discretion of the Authorized Officer, relocate reserved coarse woody material to other areas within the unit.

- Prescribed burning will be conducted in accordance with the Operational Guidance for the Oregon Smoke Management Program (ODF 1992).

T&E, S&M, Special Status, and Protection Buffer Species

- To conserve Northern spotted owls, timber harvest and felling would not occur within a 1/4 mile of a known owl site between March 1 and September 30. Helicopter flights would not occur within 1.0 miles of known owl sites between March 1 and September 30. For prescribed burns where there is a chance of smoke entering within a 1/4 mile of an owl site, burning would not occur between March 1 and August 5, and where possible, burning would not occur within 1.0 miles of the site during the same time period. Seasonal restrictions could be waived if the site is monitored and there is a determination that the owls are not nesting or that no young were produced.

- Marbled murrelet seasonal restrictions may be necessary once surveys are complete.

Project Design Features Common to Commercial Thinning Areas

Harvest Systems and Design

- Damage to the residual stand will be minimized.
- The location, number, and width of yarding corridors in the Commercial Thinnings will be specified prior to yarding.
- In general, yarding corridors will be 150 feet apart at the opposite end of the corridor from the landing.
- Yarding corridors will be kept to a maximum width of approximately 12 feet. Where possible, trees will be left to protect leave trees along the corridors. If trees to be removed in the corridors adversely affect spacing in the resulting stand, previously marked trees may be decruised to bring spacing back to the desired width.
- Yarding corridors will be placed to avoid streams and if yarding is to occur over a stream the corridor will be as perpendicular to the stream as possible. There will be no corridors in any fish bearing stream reach. All trees cut inside the 20 foot (40 feet total) riparian no-cut zone for yarding corridors will be left on site.
- In cable harvested areas, there will be full suspension over streams containing water. Where desired suspension cannot be achieved, there will be a seasonal yarding restriction. One end suspension will be required during in-haul of logs during yarding operations. Intermediate supports will be required to obtain desired suspension.
- Roads may be used as continuous landings. Extra pullouts may need to be constructed to facilitate the safe operation of equipment.
- Where roads allow, yarding will be done so that corridors are parallel, rather than radiating from one central landing.
- All cuts and fills on decommissioned roads and any openings created below landings in the “pinwheel” area created by corridors will be planted with Douglas-fir seedlings after the sale has been returned to BLM.

Port-Orford-cedar

- In Project Area F, for Port-Orford-cedar treatment in Riparian Reserves, all Port-Orford-cedar less than 12" in diameter-at-breast-height are to be cut, grubbed, or burned and may be removed. Trees 12" in diameter-at-breast-height and greater are to be girdled (to create snags) and left on site.

Red Ring Rot

- In the thinning portion of Project Area C, Phellinus (Fomes) pini (red ring rot) is present in the stand in the older cohort. Where this occurs, remove the dominant infected tree and leave the healthy codominant.

Understory Species

- In the thinning portion of Project Area C, leave the madrone and chinkapin and protect from felling and harvest operations to the greatest extent possible.

Tree Damage

- No cutting or yarding will occur during high sap flow, April 1 through August 30, without some sort of

mitigation. For instance, shielding the base of trees or marking narrow corridors and removing damaged trees upon completion of harvest from the corridor.

- All trees will be bucked to 40 feet maximum lengths.

Coarse Woody and Organic Material

- All existing coarse woody material will be retained.
- Tops and limbs will be left on site.

Riparian Areas

- In Project Areas C and F, a minimum 20 foot slope distance no-cut zone would be maintained on each side of small ephemeral stream channels within the sale boundaries and 50 feet along any fish bearing stream reach.

Soil Compaction and Water Quality

- In the ground based harvest areas, use of the harvester/ processor and forwarder will not be permitted during saturated soil conditions. The operational period will be will be from July 1 through October 31 or on slopes that are from 0 to 30% with a maximum soil moisture of 30% and slopes from 30 to 35% with a maximum soil moisture of 25% as approved by the Authorized Officer.

- No ground based equipment will operate in close proximity to stream channels or riparian areas.

- In the ground based areas, the number of passes of the forwarder will be kept to a minimum. If there is a need for the forwarder to make multiple passes in an area, the routes will be designated. The equipment will traverse over a bed of slash whenever possible to minimize the amount of soil compaction incurred during operation.

Fuels Management

- Roads within the project area have a history of intensive use by the public for access for hunting, recreation and special forest product harvest. Much of this activity occurs during peak fire danger periods. Because of hazard reduction measures need to be done along roads within the project area that are not identified for closure or decommissioning after harvest operations.

- If a ground based processor is used, as much as is possible, ensure that the operator falls trees away from roads or in such a manner as to reduce the necessity for and amount of roadside hazard reduction measures.

- Hand or machine pile all slash within 20 feet each side of those roads within harvest areas not identified for closure and decommissioning after harvest. Cover with plastic and burn during late fall and winter months. Consolidation of piles with a machine would be allowed to reduce the number of piles along the roads. The operational period for machine piling will be from July 1 through October 31 to reduce the risk of contamination of piles with soils and to reduce the possibility of soil disturbance and erosion to the ditch lines.

- Landing piles resulting from cable yarding operations need to be located a sufficient distance away from leave trees to avoid scorching when burning. When necessary, consolidate piles in identified locations to reduce the number of piles to treat. Cover with plastic and burn during late fall and winter months.

- Landing piles and concentrations from ground based processor operations located within the interior of the project area and along roads designated for post-harvest closure or decommissioning should be broken up and scattered before equipment is removed from the site.

T&E, S&M, Special Status, and Protection Buffer Species

- There would not be any harvest activities within a 1/4 mile of the Cooper's hawk nest west of the thinning units from March 1 to July 15.

Chapter 3 - Affected Environment

The description of the existing conditions reflects the application of the No Action Alternative and is the baseline for measuring the effects of the Proposed Action.

Vegetation
The late-successional forest habitat that remains in this subwatershed is scattered in small, highly fragmented patches, mingled with large blocks of early and mid-successional habitats on private lands, which are typically even-aged, single canopy conifer stands with a minor hardwood component.

The stands in the proposed treatment areas are predominately Douglas-fir with a limited component of minor species present in the understory.

Table Ten: Acres by Ownership

Drainage	BLM Acres	% BLM Ownership	Private Acres	Total
Arrow Creek	862	13	5,711	6,573
Lower Cedar Creek	88	2	4,261	4,349
Upper Cedar Creek	1,450	12	10,332	11,782
Middle Williams River	171	2	9,046	9,217
Goose Gulch	867	30	1,985	2,852
Cedar Creek Subwatershed	**3,438**	**10**	**31,335**	**34,773**

The proposed project areas are located in a Fifth Field watershed that meets the *Coos Bay District Resource Management Plan* and its Record of Decision (USDI BLM 1995) requirement for currently having over fifteen percent of federal ownership in late-successional forest.

Table Eleven: Fifteen Percent Rule by REO Fifth Field Watershed Federal Ownership

REO Fifth Field Watershed	Total Acres	Regeneration Harvest Acres	Federal Acres	Federal Acres Over 80 Years	Percent Federal Acres Over 80 Years
1710030401 South Fork Coos River	160,385	189	32,731	13,284*	41%
				• Î 13,095	40%

*Includes change in acres from projects covered in EA OR125-98-20

Port-Orford-cedar
This subwatershed is on the northeastern edge of the Port-Orford-cedar natural range. See the South Fork Coos Watershed Analysis (USDI BLM 1999) for discussion on historic stocking levels of Port-Orford-cedar. Port-Orford-cedar was noted in Project Areas A, B, and C on BLM land or adjacent private land, and is probably present in Project Areas D and E. Project Area F is least likely to have Port-Orford-cedar. Except for Project Area A, the presence of Port-Orford-cedar is limited. Pacific yew is probably in or nearby all Project Areas and is known to be in Project Areas B and F.

BLM ownership in the South Fork Coos Fifth Field watershed is about 20% and in the Sixth Field Cedar Creek subwatershed about 10%. Port-Orford-cedar is known to be healthy and present on the surrounding private lands, even without *Phytophthora lateralis* control measures. There are some localized infections of Port-Orford-cedar within the watershed on both public and private land, however; there is no known infection within the proposed project areas. For perspective, the total acreage in the natural range of Port-Orford-cedar is about 3,500,000 acres (USDI FS 1990). For perspective, this subwatershed represents approximately 1% of the Port-Orford-cedar total range and the BLM ownership within this subwatershed represents approximately 0.2%. The spread of *Phytophthora lateralis* is mostly through water and wet soil movement along roads and streams, and is influenced by human activities and natural events (i.e. movement of water or wet soil by forest roads, equipment and machinery, rainfall, saturated water flow, erosion, and slides). *Phytophthora lateralis* can kill seedlings in a few weeks and take more than 5 years to kill large trees. After infection, spores may survive more than 7 years in the root system of dead trees. Port-Orford-cedar matures early, between the ages of 5 and 9 years, and prolifically produces seeds yearly, with heavier seed crops every 4 to 5 years. Some Port-Orford-cedar exhibit a degree of resistance to *Phytophthora lateralis* and an on going screening process is being conducted by the Forest Service, BLM, and Oregon State University to identify resistant trees and breed them to enhance resistance for replanting.

Noxious Weeds

Scotch broom was present in Project Areas A and F. In Area A the scotch broom had been treated on private as well as on BLM lands. Project Area B had some Canadian and bull thistles and some scotch broom. Project Area E had Canadian thistles only. Project Areas C and D had no visible noxious weeds in the areas visited. Other Project Areas showed no evidence of treatment on the private lands.

Survey and Manage, Protection Buffer, and Special Status Botany Species

Adjacent stands of the proposed project areas have had either recent logging or consists of an early seral stage forest. There are documented locations of several Survey and Manage species within Project Area B shown in Table Twelve. Several Strategy 3 and 4 Survey and Manage species were also located in Project Area B in Attachment Two. There is a high probability that other Survey and Manage and Special Status species will occur within all project areas, due to potential habitat in each area. See Attachment Two for listing of all Special Status Species that could occur in the project areas.

Table Twelve: Survey and Manage Fungi Species Located in Project Area B

Species	Strategy
Bondarzewia meserterica	1, 2, 3
Helvella compressa	1, 3
Neournula pouchetii	1, 3
Otidea onotica	1, 3
Phaeocollybia oregonensis	1, 3
Ramaria auranteesicciscens	1, 3
Ramaria araiospora	1, 3
Ramaria cyaneugranosa	1, 3
Ramaria gelatiniaurantia	1, 3
Ramaria rubrienanescens	1, 3

Ramaria stuntzii	1, 3
Sarcosoma latahense	1, 3

*Survey field data forms are available in the Green Cedar botanical file folder.

All of the species in Table Ten have approved management recommendations. Known sites of survey Strategy 1 species will be managed to maintain habitat characteristics. This will ensure local species persistence in compliance with the Survey and Manage standard and guideline.

Fire

The sub-watershed and project areas contained therein, have a catastrophic fire history dating back as recently as the late 1800's and since then, fire suppression activities have all but eliminated natural fire from the landscape (USDI BLM 1999, pages 16). Previous harvest activities on BLM administered lands that are adjacent to or near the proposed project areas have received some form of site preparation to reduce fuel loadings and prepare the site for reforestation. Most commonly these were in the form of hand or machine piling, cover and burn, and broadcast burning. Some of the oldest BLM harvest units received only a herbicide treatment to control brush after reforestation (Timber Sale TS74-24). This is in contrast to most of the adjacent properties surrounding the project areas which are owned by Weyerhauser Timber Company which have been predominately commercially harvested and reforested over the last 40 years and range in age from approximately 0 - 40 years.

Fuel Loadings

Most Weyerhauser lands did not receive any site preparation involving prescribed fire to reduce fuel loading other than landing pile burning. This practice has resulted in a landscape of semi-continuous unburned logging slash at various stages of decomposition and could possibly contribute to a large catastrophic fire if weather and fuel conditions supporting such an event came together. All project areas, except those areas behind locked private gates, have a history of intensive use by the public for recreational activities, primarily hunting, and these activities often occur during periods of high fire danger.

Available Water Sources

Existing water sources on private and BLM lands, while present, are limited in the proposed project areas. Most designated water sources for fire suppression in the area of the proposed action exist on private property and may require maintenance prior to use. Most of these sites are recharged during the wet season by intermittent stream flows and, in the summer dry months, may not be useable except for emergencies as the water resource would be rapidly depleted. Water haul from the lower creeks may be necessary and would likely increase site prep costs for units that are broadcast burned.

Soils

The Cedar Creek Subwatershed is located in the Coast Range physiographical province. The geologic materials associated with the soils of the area are developed from the Tyee Formation. The Tyee Formation is composed of rhythmically bedded sandstone and siltstone. The Tyee tends to have high ground water in some areas, rapid runoff, steep slopes, and sharply alternating beds of sandstone and softer siltstones. The potential for slumps, debris and earth flows are intensified by these characteristics. These types of slope failures have the greatest impact on the road systems.

The soils found within the proposed harvest areas are Fernhaven Gravelly Loam (370E), Fernhaven-Digger Complex (375F), Milbury-Bohannon-Umpcoos Association (38F), Preacher-Bohannon Complex (312F), Preacher-Bohannon-Digger Complex (350G), Digger-Preacher Complex (376G), Digger-Bohannon-Umpcoos Complex (240G), Digger-

Umpcoos-Rock Outcrop Association (437G), Umpcoos-Rock Outcrop Association (58F), and Orford Gravelly Silt Loam (325E). Specific soil data can be obtained from the February 1994 Douglas County Area, Oregon Soil Inventory (USDA SCS 1994) and the Soil Survey of Coos County, Oregon (USDA SCS 1989). See Attachment One for additional soil information.

Hydrology

The hydrology of this area is driven by precipitation in the form of rain. Climate in this subwatershed exhibits both a coastal and inland precipitation pattern. Precipitation in the watershed varies from approximately 80 inches per year near the confluence with Williams River to 60 inches per year in the headwaters to the East, with 90% of the precipitation occurring between October through April. Portions of the area may receive occasional snow, but the quantity and duration of accumulation do not normally produce rain-on-snow runoff events. Infrequent rain-on-snow elevations over 1800 feet within the proposed harvest units on BLM managed lands accounts for less than 3% of the total subwatershed area. Additionally, over 85% of this total is within the proposed commercial thinning units. The peak flows, low flows, annual flows and groundwater levels are all dependent on the amount, intensity and distribution of rainfall. The close correlation between precipitation and runoff indicates that this system rapidly translates rainfall into runoff due to a high drainage density, low bedrock permeability, high precipitation totals, and steep slopes in the headwaters.

The Cedar Creek subwatershed Analysis Area is comprised of five drainages; Arrow Creek, Upper Cedar Creek, Lower Cedar Creek, Middle Williams River, and Goose Gulch. Drainage area is approximately 54.3 mi^2. The confluence of Cedar Creek and the Williams River forms the mouth of this area, flowing downstream to join with Tioga Creek. At this point the two rivers combine to form the South Fork Coos River and eventually enter Coos Bay and the Pacific Ocean to the West. Streams found within the analysis area consist of predominantly the A, B, C, and F streams types under the Rosgen classification system, with type A constituting about 80% of the total. Stream orders are primarily 0 through 3rd, with higher 5th and 6th order streams occurring on Cedar Creek and the Williams River. A 7th order stream is formed at the mouth of the subwatershed, adjacent to Project Area D.

The BLM manages 10% of the subwatershed in an intermingled land pattern. Road densities are approximately 3.1 mi/mi^2. Stream drainage density on BLM ownership is 8.5 mi/mi^2, with the whole subwatershed having a drainage density of 7.2 mi/mi^2. Table Eleven lists the stream densities for Cedar Creek subwatershed.

Table Thirteen: Cedar Creek Subwatershed Existing Stream Density Summary

Stream Order	Length (miles)	Drainage Density (mi/mi^2)
1	255.50	4.70
2	91.22	1.68
3	42.36	0.78
4	23.39	0.43
5	8.81	0.16
6	15.00	0.28
Total	436.28	8.03

Water Quality

The beneficial uses that are dependent on aquatic resources in this subwatershed are: anadromous fish passage,

salmonid fish rearing, salmonid fish spawning, resident fish, other aquatic life, wildlife and hunting, fishing, boating, and water-contact recreation (USDI BLM 1999). The water quality parameters that are critical to these beneficial uses are: turbidity, dissolved oxygen, water temperature, nutrients, total dissolved gases, pH, sedimentation, erosion, low flow, debris and structure (USDI BLM 1999).

The 1998 303(d) list (ODEQ 1998) designates Cedar Creek and Williams River stream segments as water quality limited for temperature from their mouths to headwaters. The Oregon Department of Environmental Quality also listed the South Fork Coos River, Tioga Creek, Morgan Creek, Daniels Creek, as well as, the Williams River as potential nonpoint pollution sources (ODEQ 1988). The water quality parameters identified as potential problems or could indicate impacts from past practices are: nutrients, sediment, erosion, structure, turbidity, and temperature. The BLM operates gauging stations on Tioga Creek and Priorli Creek, within the South Fork Coos River watershed, which continuously collects stage and temperature data, and also a precipitation gauge at Priorli Creek.

Historic water quality conditions within the subwatershed are difficult to determine since no specific data was collected. However, it is relatively safe to assume that water quality was considerably higher before large-scale timber harvest operations and extensive road building activities. The major impacts to water quality before modern development were hillslope processes, which at their extreme, were often driven by intense storm events, and fire. However, since this watershed evolved through these processes, we have reason to believe the water quality will recover in a relatively short time following these kinds of events (USDI BLM 1999).

Pre-management estimates of shade, based on 1961 aerial photos, indicate that canopy closure over Williams River, Cedar Creek and their fish bearing tributaries to be similar to current conditions except for Williams River main stem between Five-mile Creek and Wilson Creek, and parts of Lost Creek. Riparian shade is unlikely to have a significant influence on stream temperatures where the natural low flow stream width exceeds 100 feet (Washington Forest Practice Board 1992). Williams River, below Bear Gulch above the analysis area, approaches that threshold with a low flow width of 80-feet, and South Fork Coos exceeds that threshold with a 120-foot low flow width.

Site Description:
Project Area A drains South-Southeast into an unnamed tributary to Cedar Creek.

Project Area B is dissected by several small tributaries which flow North into Cedar Creek, which is a tributary to the Williams River. There is a small pond located in the Northwest corner of this unit.

Project Area C is divided by Callahan Creek, a tributary to Cedar Creek, which flows Southeast

Project Area D is in the vicinity of the confluence of the Williams River and Cedar Creek, which drain the area to the Northwest.

Project Area E is in the headwater area of an unnamed tributary which drains generally North toward Callahan Creek.

Project Area F
Section 10: This section of the project area is primarily within the headwaters of Gooseberry Gulch Creek, a tributary to the Williams River, but a small portion of the proposed project area in section 10 drains into Cabin Creek (also a tributary to the Williams River) to the north. The remainder of the project area in section 10 drains into Gooseberry Gulch Creek to the east.

Section 14 & 15: the proposed harvest area in these sections drain into Gooseberry Gulch Creek and Tioga Creek.

Fish Species/ Habitats

The following is a list of the fish species known or believed to occur in the South Fork Coos Watershed:

chinook salmon	speckled dace
coho salmon	longnose (Millicoma) dace
chum salmon	largescale sucker
steelhead trout	Pacific lamprey
resident and sea-run cutthroat trout	western brook lamprey
threespine stickleback	prickly sculpin
redside shiner	reticulate sculpin

Other than the salmonids listed, the occurrence of the fish species in relation to the proposed project reaches is not known, but it is likely that they occur in the mainstem of Williams River and Cedar Creek.

The following list summarizes the special status fish species known to occur in the vicinity of the proposed projects. It is BLM policy to treat proposed and candidate fish species as though they were listed, and to conduct informal conferencing with the National Marine Fisheries Service on actions that may affect special status species or their habitats.

- Populations of coho salmon within the South Fork Coos River watershed are included in the larger Oregon Coast Coho Evolutionarily Significant Unit. These fish were listed as a "Threatened" under the Endangered Species Act in August of 1998. The range of coho salmon in relation to the proposed project areas is listed below.

- Populations of coastal cutthroat trout and steelhead trout within the South Fork Coos River drainage are included in the larger Oregon Coast ESU. These fish were proposed for a Federal listing under the Endangered Species Act, and were determined to be a "Candidate" species. A listing assessment is currently underway for these species.

Distribution of Special Status Fish Species

Project Area A is adjacent to an unnamed tributary to Cedar Creek. No fish occur in the streams within or adjacent to the unit boundaries. The nearest fish-bearing stream reach, which is approximately 0.5 miles to the east of the unit, is inhabited by resident cutthroat trout. The upper extent of anadromous fish distribution (coho salmon and steelhead trout) is approximately 2 miles downstream. The range of sea-run cutthroat is not known, but most likely downstream of the range of coho and steelhead trout.

Project Area B is adjacent to Cedar Creek, which is a tributary to the Williams River. Mainstem Cedar Creek is inhabited by coho salmon, steelhead trout and resident cutthroat trout. The range of sea-run cutthroat is not known, but it is likely that they could occur within Cedar Creek near the proposed harvest units.

Project Area C is divided by Callahan Creek, which is inhabited by coho salmon, steelhead trout, and resident cutthroat trout. The range of searun cutthroat is not known, but it is possible that they could also occur in Callahan Creek within the range of coho and steelhead.

Project Area D is in the vicinity of the confluence of the Williams River and Cedar Creek, where coho salmon, steelhead trout, resident cutthroat trout, and possibly searun cutthroat trout occur.

Project Area E is in the headwater area of an unnamed tributary to Callahan Creek. The nearest fish-bearing stream

reach, which is approximately 0.5 miles to the north of the unit, is inhabited by resident cutthroat trout. The upper extent of coho salmon and steelhead trout distribution is approximately 1 mile downstream of the proposed harvest unit to the north. The range of searun cutthroat is not known, but it's likely to overlap that of coho salmon and steelhead trout.

Project Area F
Section 10: This section of the project area is primarily within the headwaters of Gooseberry Gulch Creek, a tributary to the Williams River, but a small portion of the proposed project area in Section 10 drains into Cabin Creek (also a tributary to the Williams River) to the north. No fish occur in Cabin Creek within approximately 1 mile of the unit boundary to the north; resident cutthroat trout occur approximately 1 mile downstream, and anadromous fish distribution is over 1.5 miles downstream of the unit boundary. The remainder of the project area in section 10 drains into Gooseberry Gulch Creek to the east. Resident cutthroat trout occur approximately 0.5 miles east of the section boundary and coho salmon and steelhead trout occur approximately 2 miles downstream.

Section 14: All of the proposed harvest area in this section drains into Gooseberry Gulch Creek. Resident cutthroat trout occur within an approximately 0.3 mile reach of the stream in the Northwest corner of this section. Coho salmon and steelhead trout occur approximately 1 mile downstream for the proposed project area.

Section 15: All of the proposed harvest area in this section drains into Gooseberry Gulch Creek, but no fish occur within 0.5 miles of the section boundary. Resident cutthroat trout occur approximately 0.5 miles to the north and 1 mile to the east. The range of coho salmon and steelhead trout is approximately 2.5 miles to the north and 3 miles to the east.

Fish Habitat
No comprehensive stream habitat inventories are available for the fish-bearing stream reaches within and immediately adjacent to the proposed project areas. Stream habitat inventories conducted on Cedar Creek by the Oregon Department of Fish and Wildlife in 1993 ended at the BLM property line on the west side of Project Area B, and habitat inventories for the Williams River are not representative of the stream reaches within the project areas. However, field surveys conducted in the fall and winter months of 1999 and 2000 indicate that the fish-bearing stream reaches in the vicinity of the proposed project areas are in "fair" to "good" condition.

Although timber harvest and road construction in adjacent stands has likely reduced the amount of coarse woody debris in the steam channels upstream and downstream of the proposed units, there is no evidence of stream cleaning having occurred within the boundaries of the proposed units. Numerous single logs and accumulations of logs were observed throughout the stream channels, including the second growth stands in Project Area F. Significant amounts of coarse woody debris were left on the ground in the Riparian Reserves and within the stream channels when the stands were harvested.

The existing condition of the Riparian Reserves is providing adequate shade to maintain desirable water temperatures, and stream-side sources of large wood for future recruitment into stream channels are intact. Although the potential for debris flows to deliver large amounts of wood and debris to some of the stream channels has been reduced by land management practices in adjacent areas, the high gradient channels within the stands are generally intact.

Wildlife Species
Northern Spotted Owl
Within the Cedar Creek subwatershed there are 4 Northern spotted owl sites on BLM land and 9 sites on private

land. In addition to these sites within the Cedar Creek subwatershed there are other spotted owl site centers just outside the subwatershed boundary whose home range radius (1.5 miles for Oregon Coast Range province) overlaps with it. There are 11 of these sites on BLM land and 3 on private land. Overall there are 27 northern spotted owl sites either within the subwatershed or whose home range overlaps with it.

Several of the proposed timber sale units are within a 1/4 mile of a spotted owl site center. These include Unit 6 of Project Area B, Units 2, 4 and 5 of Project Area C and Unit 2 of Project Area D. These units occur within a 1/4 mile of 3 BLM owl sites (Upper Cedar Creek, Callahan and Williams Bend). Actual spotted owl site centers occur in Unit 2 of Project Area C (Callahan) and Unit 2 of Project Area D (Williams Bend). Proposed sale units within 1.5 miles of an spotted owl site center include Units 1, 3, 5 and 6 of Project Area B, Units 1-6 of Project Area C, Units 1-3 of Project Area D, both Units in Project Area E and part of the treatment units in Sections 14 and 15 of Project Area F. The spotted owl site centers within 1.5 miles of these proposed units include 5 on BLM land (Upper Cedar Creek, Callahan, Williams Bend, Williams River and Tioga Creek) and another 3 on private land. Hence 8 of 27 northern spotted owl sites (30%) either within the subwatershed or whose home range overlaps it could be affected by the proposed action.

Spotted owl monitoring work has been conducted in the Cedar Creek subwatershed over many years by various federal and private company crews. Spotted owl monitoring in the subwatershed began with a limited effort by BLM in 1976 and then increased greatly from about 1985-1990. Most spotted owl sites in or adjacent to the Cedar Creek subwatershed have been monitored from 1990 up to the present. Of the 15 BLM owl sites within the subwatershed, or whose site center is within 1.5 miles of it, spotted owls have nested successfully and produced young at 12 of these. At the other 3 BLM sites there has been a pair present at least 1 year but no nesting has occurred. Of the 12 private owl sites within the subwatershed, or whose site center is within 1.5 miles of it, owls have nested successfully and produced young at 9 of these. At the other 3 private sites there has been either a single or pair present at least 1 year but no nesting has occurred.

Project Area A was monitored in 1990 and 1991; there were no spotted owl responses. Project Area B was monitored in 1990 resulting in the discovery of Upper Cedar Creek site. Some monitoring of the general vicinity of Project Area B continues to the present in association with this site. Project Area C was first monitored in 1989. In 1990 a nesting pair of owls was found in the area and this became the Callahan site. Monitoring of Project Area D began in 1995 and has all been related to the Williams Bend owl site first discovered that year in that area. The site continues to be monitored to the present. There are no records to indicate Project Area E has ever been monitored for spotted owls. There was some limited monitoring of Project Area F in 1976 and then part of it was monitored again in 1994 and 1995. There were never any spotted owl detections associated with monitoring Project Area F.

During the 2000 nesting season the spotted owls associated with the Upper Cedar Creek site, which is adjacent to Project Area B, nested outside their designated core area. The 2000 nest location is either in Unit 6 of Project Area B (east central part) or in the Riparian Reserve area between Unit 6 and the owl core area.

None of the proposed Project Areas occur within northern spotted owl Critical Habitat Units. Unit 6 of Project Area B and Units 1, 2 and 3 of Project Area C occur within a 1/4 mile of spotted owl 100 acre cores but none of the units for any of the Project Areas occur within these same core areas.

All of the Project Area units are suitable habitat for the spotted owl except that possibly Unit 6 of Project Area C and all units in Project Area F are not suitable. All of the Project Area units provide dispersal habitat for the spotted owl. Relative to helicopter operations in association with the proposed action (i.e. yarding and site preparation) Units 1, 3, 5 and 6 of Project Area B, Units 1-6 of Project Area C and Units1-3 of Project Area D are within 1.0 miles of known

site centers.

Marbled Murrelet

Within Cedar Creek subwatershed there are no occupied marbled murrelet sites on BLM land, but there are some occupied murrelet sites on private land. None of the proposed Project Areas are within 1/4 mile of an occupied site on BLM land. However for Project Area E, the west unit appears to be within 1/4 mile of the occupied site on private land and the east unit is likely within 1/2 mile of it. The habitat on private land appears to be contiguous with the west unit of Project Area E. Relative to project aspects that involve helicopter use none of the proposed units are within 1.0 miles of an occupied site on BLM land. But Units 4, 5, 6 and possibly 3 of Project Area C are within 1.0 miles of another occupied site on private land. Finally Project Area A is within about 1.25 miles of an occupied MM site on private land so it is possible that helicopter flight paths could occur within 1.0 mile of this site.

There has been limited marbled murrelet monitoring work in the Cedar Creek subwatershed. Project Area A was surveyed for murrelets in 1998 and 1999. There were no detections. Project Area B was monitored in 1994 and 1995; there were no detections. These surveys expired so Project Area B was resurveyed in 1998 and 1999. Again there were no murrelet detections. Finally there are 2 stands of suitable habitat immediately adjacent to the Project Area F units that were surveyed in 1995 and 1996. There were no murrelet detections associated with these surveys. The surveys are now expired.

Units 1 and parts of Units 3 and 6 of Project Area B, Units 2, 3, 4 and 5 and part of Unit 1 of Project Area C and Units 1-3 of Project Area D contain suitable habitat for marbled murrelet. The other units for the Project Areas are not suitable murrelet habitat. Units 1-6 of Project Area C and Units 1-3 of Project Area D are all within a 1/4 mile of unsurveyed suitable murrelet habitat on BLM land. Unit 6 of Project Area B, Units 4, 5, and 6 of Project Area C, Units 1-3 of Project Area D and the west unit of Project Area E are all likely within a 1/4 mile of suitable murrelet habitat on private land. None of the units for any of the Project Areas occur within a marbled murrelet Critical Habitat Unit.

Bald Eagle

There has been some bald eagle monitoring work in the Cedar Creek subwatershed. All surveys were conducted with a helicopter and focused on major rivers and streams and adjacent habitat. A small part of the west central part of the subwatershed along the Williams River was searched in 1985. In 1993 there was another survey that covered Williams River to where it intersects with Cedar Creek, then along Cedar Creek going east to the extent of eagle habitat. Finally there was a survey in 1995 that covered the Williams River to where it intersects Cedar Creek. There were no bald eagle nests found during any of the surveys.

There are no known bald eagle nests or roosts within 1/4 mile or 1/2 mile (line of sight) of any of the units associated with the Project Areas (Isaacs and Anthony 1999). Nor are there any known perch or roost trees in the vicinity of the Project Areas. Given that bald eagles typically nest on upland slopes adjacent to bodies of water (Anthony and Isaacs 1989) Units 1-3 of Project Area D are suitable habitat for this species but in all likelihood those associated with other proposed Project Areas are not.

Peregrine Falcon

There are no records of any peregrine falcon monitoring work within the Cedar Creek subwatershed and no known peregrine falcon nest sites within the vicinity of any of the Project Areas. There is potentially suitable falcon habitat present in the subwatershed as there are many cliffs within it.

Other Special Status Species

There are other Special Status Species that could potentially occur in the units associated with the Project Areas or their vicinity (Attachment Seven). There have not been any surveys for any of these species in the proposed units.

However in Units 3, 5 and 6 of Project Area B the pileated woodpecker was either seen, heard or excavations were observed in trees. The clouded salamander has been found in Unit 3 of Project Area B. There has been some limited monitoring for northern goshawk within the Cedar Creek subwatershed. In 2000 a two year survey for the goshawk was completed at Project Areas A and B. There were no northern goshawk detections during these surveys.

There is some habitat in the units associated with Project Areas A-E, and their vicinity, for most of the Special Status Species that could potentially occur in the area (Attachment Seven). Given the relatively young age of the stands associated with Project Area F it is much less likely that many of these same Special Status Species would actually be present in them. Many of the Special Status Species that could occur in the proposed Project Areas utilize or are associated with snag and down log habitat (Brown 1985).

Survey and Manage Wildlife Species
There are two Survey and Manage wildlife species that are relevant to the proposed action in the Cedar Creek subwatershed, the Del Norte salamander and the red tree vole.

There have not been any Del Norte salamander surveys within the subwatershed nor are there any known occurrences of this species in the subwatershed to date. All stands that comprise Project Area F are within the Coos Bay District defined Del Norte salamander range. None of the other Project Areas occur within the range. Habitat for the Del Norte salamander could be present in Project Area F.

Surveys for the red tree vole were initiated in the subwatershed in February, 2000. Protocol surveys for Project Area A and Units 1, 3, 5 and 6 of Project Area B have been completed. There was one nest confirmed in Unit 1 of Project Area B. In Project Area A and Units 3, 5, and 6 of Project Area B there were multiple confirmed nests found. All units associated with all of the Project Areas not yet surveyed (C, D, E and F) provide habitat for the red tree vole and it is highly probable nests will also be found in these units.

Northwest Forest Plan Protection Buffer Species
The only Protection Buffer wildlife species that could potentially occur in the Cedar Creek subwatershed are the fringed myotis, silver-haired bat, long-eared myotis, long-legged myotis and pallid bat. District records indicate that there have not yet been any documented occurrences of these species in the subwatershed nor have there been any surveys for these bats in the area. It is possible that caves or abandoned wooden buildings occur within the units associated with the proposed Project Areas that would provide bat habitat. It is not very likely that any mines or abandoned wooden bridges occur within in any of the units.

Coos Bay District Resource Management Plan Buffer Species
Management direction for wildlife under the Coos Bay District Resource Management Plan (USDI BLM 1995) includes buffers for some species when a nest site is located. Of the species listed in the Coos Bay Resource Management Plan that would receive this protection the ones most likely to occur in the units associated with the Project Areas are the sharp-shinned hawk, Cooper's hawk, red-tailed hawk, osprey and great blue heron. There have not been any surveys conducted specifically for these species within the Cedar Creek subwatershed. A red-tailed hawk was seen in Unit 6 of Project Area B. A Cooper’s hawk nest site was found in 1998 that was within a 1/4 mile of part of Project Area F.

Most of the units associated with the proposed action provide habitat for the sharp-shinned hawk, Cooper’s hawk and red-tailed hawk. Given the proximity of Project Area D to the Williams River these units provide habitat for the osprey and great blue heron but it is not likely that the other Project Areas do since they typically nest in close proximity to water.

Other Wildlife Species
Appendix T of the Final Coos Bay District Proposed Resource Management Plan Environmental Impact Statement Volume II (USDI BLM 1994) provides a complete list of wildlife species for the Coos Bay District. Many of the amphibians, reptiles, birds and mammals listed in Appendix T that were not previously discussed under the Special Status Species, Survey and Manage, NFP Protection Buffer Species and Coos Bay District Resource Management Plan Buffer Species sections could occur in the proposed units associated with the Project Areas or their vicinity.

During field reviews of Units 3, 5 and 6 of Project Area B signs of black-tailed deer and Roosevelt elk presence (trails, scat, etc.) were seen in all of these units. Bird species either seen, heard or detected by sign (foraging marks, drillings, cavities, etc.) in some or all of these 3 units include: red-breasted sapsucker, hairy woodpecker, American crow, dark eyed junco, winter wren, varied thrush, common raven and a nuthatch.

During red tree vole climbing surveys an owl nest was located in Unit 3 of Project Area B. Under Oregon State Office BLM Instruction Memorandum Number OR-96-78 this nest site would receive a 5 acre nest buffer. Additionally, there would be a seasonal restriction on activities within 1/4 mile of the nest during the nesting season.

Wildlife Habitat
General Wildlife Habitat Types
General wildlife habitat types present in the sale units include mid-seral, late-successional and old-growth conifer forest. All conifer forest types have an overstory dominated by Douglas-fir with western hemlock and western red cedar also present as a lesser component. Mixed conifer-hardwood late-successional forest and mixed conifer-hardwood mid-seral forest types also are present. Hardwood tree species occur in all the conifer forest habitat types as a minor component and their presence in these stands is variable depending on site conditions. Hardwoods are more abundant and make up a notable portion of the mixed conifer-hardwood stands. Hardwood tree species generally occurring in the project areas include big leaf maple, madrone, red alder and myrtlewood.

Project Area A, B, C, D and E are all primarily late successional conifer forest habitat. There is some old growth conifer forest in Unit 3 of Project Area B (about 30% of the unit). Unit 6 of Project Area B has some residual old growth trees present within the area. There could be old growth conifer residuals in other forest stands not yet field checked. For Project Area C, Units 1, 2 and 6 are mixed conifer-hardwood stands. Part of these units are mid-seral and part are late successional forest. Project Area F is mid seral conifer forest. There are not likely any old growth residuals in this area.

Special Habitats
To date the only special habitat features identified are for Unit 3 of Project Area B. In the south part of Unit 3 there are 2 larger rock outcrops that are a special habitat. Both have large boulders and exposed rock faces with many cracks, crevices and holes. Both rock outcrops have a forest canopy overhead and mosses, ferns and other plants growing on them. One of the rock outcrops had seasonal water seeping over it. Other special habitats in Unit 3 include a pond and a canopy gap (about 0.5-1 acre size) in the north part of it. Within the gap there is a dense fern ground cover and several large down logs present. There are also several big leaf maple trees within the gap and many of them on the north end of it. This is a unique stand feature providing habitat that is not present elsewhere within the proposed unit boundary.

Key Habitat Features
Snags
Snag monitoring survey work within the Cedar Creek subwatershed has been very limited. The only surveys conducted to date are for Units 1 and 5 of Project Area B. For Unit 1, surveys indicate there are 4.9 snags per acre

and for Unit 5 there are 9.2 snags per acre (USDI BLM 1999). Given these numbers it appears there are an adequate number of snags present in Project Area B to meet the ROD (USDA and USDI 1994) standard of providing enough of them to support cavity-nesting birds at 40% of potential population levels. Observations from field reviews of Units 3, 5, and 6 of Project Area B indicate that overall there were few areas where snags are concentrated, that there were more snags with relatively smaller diameters and fewer present with large diameters, and most were in Classes 3, 4, and 5 (the most advanced decay classes). It is unknown whether snag conditions in Project Areas A, C, D and E, the other areas that have late successional forest habitat, are similar to those found in Project Area B or not.

Project Area F, which consists of mid-seral conifer stands, has not been surveyed for snags. However, another mid-seral conifer stand relatively close to Project Area F, the Deadhorse CT #2 unit, was surveyed and found to have 0.4 snags per acre (BLM 1999). If conditions in stands that comprise Project Area F are similar to those in the Deadhorse CT unit then the snag resources present would not provide adequate conditions to support cavity-nesting birds at 40% of potential population levels. However, this is likely true of many mid-seral conifer stands as they are typically too young for many snags to have developed yet within them.

Down Logs

Down log monitoring survey work within the Cedar Creek subwatershed also has been very limited. The only surveys conducted to date are for Units 1 and 5 of Project Area B. For Unit 1 surveys indicate there are 242 lineal feet per acre of down log habitat for Unit 1 and for Unit 5 there are 537 lineal feet per acre (USDI BLM 1999). Hence the data from Units 1 and 5 suggest that the stands in Project Area B currently meet and exceed the ROD standard for down log habitat of providing 120 lineal feet per acre of decay Class 1 and 2 material (Interagency 1994). Observations from field reviews of Units 3, 5 and 6 of Project Area B indicate that while overall down log habitat was present in lower densities throughout these areas there also are several locations where heavy concentrations of this material occur. Class 1 material was not a significant portion of the down log material observed but there was a lot of Class 2 wood seen. Hence field observations provide additional evidence that the stands in Project Area B likely meet the ROD standard. Whether the same is true for Project Areas A, C, D and E, which also have late successional forest, is unknown.

Project Area F, which consists of mid-seral conifer stands, has not been surveyed for down log habitat. However, two other nearby mid-seral conifer stands, Beyer's Way Commercial Thinning and Burnt Ridge Commercial Thinning units, were surveyed and in both cases neither stand had any down log habitat meeting Class 1 standards (USDI BLM 1999). The condition of stands comprising Project Area F, relative to down log resources, could be similar to those recorded in the Beyer's Way and North Tioga Commercial Thinning units. These conditions are likely typical of many mid-seral conifer stands.

Survey and Manage Mollusk Species

All proposed Project Areas are within potentially suitable Survey and Manage mollusk habitat for the three species identified as likely being present in the Umpqua resource area. These species are as follows: Oregon megomphix (*Megomphix hemphilli*), blue-grey tail dropper (*Prophysaon coeruleum*), and Papillose tail dropper (*Prophysaon dubium*). Project Areas A and B have partial or completed mollusk protocol surveys. See Attachment Seven. Project Areas C, D, E, and F currently have no protocol surveys started.

Cultural Resources and Native American Religious Concerns

Review of project documentation and records check shows no known cultural resources in the project areas. However, discussions with project personnel indicate two historic resources are found, both cabin remnants. One cabin is located in Project Area B and the second is in Project Area C.

Environmental Justice

The proposed Project Areas are not known to be used by, or disproportionately used by, native indians, and minority or low-income populations for specific cultural activities, or at greater rates than the general population. This includes their relative geographic location, and cultural, religious, employment, subsistence, or recreational activities that may bring them to the proposed areas. The BLM is not aware of any disproportionately high or adverse environmental or human health effects that would occur to native indians and minority or low-income populations as a result of the proposed action.

Chapter 4 - Environmental Consequences

This chapter is organized by Resources.

Analysis of the No Action and Proposed Action Alternatives has shown no impacts to Areas of Critical Environmental Concern (ACEC), prime or unique farmlands, flood plains, wetlands, Wild and Scenic Rivers, or wilderness values.

Impacts on Vegetation

No Action Alternative

Regeneration Harvests

The No Action Alternative would lead to a climax condition. It would allow for the proposed stands to continue the late-seral stage of development. This would lead to a gradual decline of the existing dominant, Douglas-fir, overstory with the replacement of younger, smaller, less vigorous, shade tolerant species, such as western hemlock and western redcedar. Establishment of Douglas-fir reproductions in hardwood and brush dominated understories is not likely.

Commercial Thinning and Density Management

The No Action Alternative would result in continued slowing of annual stand volume growth and individual tree growth would tend to stagnate with a high density of stems. In the understory, shade tolerant plants would increase and plants requiring open sunlight would decrease with increased shading overtime. Decreased growth rates in the overstory would slow the development of a potential source of larger snags and coarse woody material, the development of vertical and horizontal structural complexity, and tree species diversification. The No Action Alternative would result in a slower development of late-successional forest structural characteristics and the habitat features which late-successional forest species depend on. There would also be an increase in suppression mortality over time in the smaller tree diameters, increasing the number of small diameter snags. Understory development of trees would decline or cease due to increased shading. Wood products from future expected mortality would not be recovered.

Proposed Action

Regeneration Harvest

Regeneration harvest will result in removing most of the overstory trees. The stands will then be replanted with conifer seedlings following site preparation. After harvest, annual and perennial vegetation growth is promoted due to the increased availability of light and nutrients. Once the conifer seedlings have overtopped the existing competing species, they will grow at a relatively equal rate until competition between trees again reduces individual tree growth and suppression mortality occurs.

Harvesting the stands will increase their vulnerability to infestation by non-native invasive plants, which thrive in the resulting disturbed soils and brighter light conditions. The canopy will eventually close, however, shading out these invasive species. Some herbaceous and epiphytic species may have reduced vigor from the alteration of the microclimate, while some species of herbs and shrubs will flourish from the increased sunlight. Eventually, as the forest grows, conditions will come to approximate the current condition.

Cumulative impacts include previous activities, such as timber harvest, road construction, and silvicultural activities, in relation to the effect on plants that are dependant upon late-successional habitats. Many of the stands adjacent to the proposed project area are in an early to mid-seral stage. The stands in private ownership are expected to be on a rotation that would negate the probability of these forest stands reaching a late-seral condition. Most of the

private stands in the area have already been harvested.

Commercial Thinning and Density Management
The stocking density of the main overstory species has a major affect on the rate of stand development and the type of stand that results. Diameter growth is highly related to stand density. In the long term, reducing stand densities will increase crown development and diameter growth on the residual trees (Tappeiner 1992). Other variables affected by stand density are microclimate, stand stability, understory development, browse quality and quantity, hiding cover, size of snags and rate and time of occurrence.

The areas proposed for commercial thinning are located at higher elevations on the landscape and are overstocked. Because of the initial stand densities, the thinning proposals are conservative and should promote establishment of a windfirm stand. The actions will enhance vertical complexity and species diversity of shrubs and conifers by releasing advanced regeneration if present and stimulating seeding of minor species. Thinning at the proposed levels will allow for more growing space for dominants and codominants for the short term. However, in approximately 20 years the trees would start competing again for light and nutrients. The growth of individual trees would then slow with the increased competition. The trees would soon close in on each other and eventually the less competitive ones would die producing some smaller snags and down logs. It is likely that this natural mortality of smaller trees would provide some habitat values for insects and some wildlife species, but would not be very durable due to the low proportion of rot resistant heartwood in smaller trees. To perpetuate the stand on a trajectory toward ACS objectives, a second entry would be required. The densities of Douglas-fir left in the Riparian Reserves should provide for a range of future management options and insure and adequate potential recruitment for snags and coarse woody material.

Impacts on Port-Orford-Cedar
No Action Alternative
Spread of *Phytophthera lateralis* would continue at current rates along roads and streams. The greater proportion of roads and streams in this area are under private control. All private roads and streams are assumed to be infected, providing an avenue for further infection on BLM lands. Closing BLM controlled roads to vehicle traffic would be beneficial to the control the spread of this disease. BLM roads identified to be closed with the Proposed Action would not be closed at this time.

As *Phytophthera lateralis* spreads along roadsides and streams, fewer Port-Orford-cedar will be expected to survive. The primary exception to this being individuals that are disease resistant. Infection can spread away from roads and streams to lower risk areas by root grafting and movement of spores downhill to trees within close proximity. Other human or natural events can aid in the spread from high risk to low risk sites. However, the overall Port-Orford-cedar population viability is unlikely to be affected throughout the analysis area since Port-Orford-cedar is such a small component of the forest and so widely scattered.

Proposed Action
Direct and Indirect Effects:
Except for Project Area F, any type of BLM logging activity, road closure, or Port-Orford-cedar treatment will have limited effect on existing *Phytophthera lateralis* conditions because those areas are already heavily impacted by private roads and streams originating on private lands. All private roads and streams are assumed to be infected and the majority of the roads surrounding the Project Areas are privately controlled. If private owners allow BLM to sanitize Port-Orford-cedar along haul routes, then a short term reduction in the current rate of spread can be expected. There would be a reduced risk of infection from high risk sites to low risk sites. Spread of infection within yarding corridors is expected to be negligible. Aerial operations should have no impact. However, current rates of

infection and spread will continue along streams, with little change due to logging activities. Design features for the ground based logging portion of Project Area F should reduce the potential for introduction and spread of *Phytophthera lateralis*.

Cumulative Effects:
Permanent road closures or road closures that last 15 to 20 years could aid in the elimination or significant reduction of *Phytophthera lateralis* on those sites. Road side sanitization benefits will be lost as Port-Orford-cedar reestablishes from existing seed sources or seed beds. Streams in Project Areas A, C, D, and E originate on private lands, pass through BLM, and go back onto private lands, so any sanitation of Port-Orford-cedar or additional introduction of *Phytophthera lateralis* on BLM lands would not significantly affect the long term rate of introduction or spread. The proposal for Project Area B would not likely impact the introduction and spread of *Phytophthera lateralis* in the riparian zones. The streams in Project Area B originate on BLM lands and immediately feed into Cedar Creek. Cedar Creek is predominately on private lands and most likely infected. This area is surrounded by private ridge top road systems that are assumed to be infected and drain downhill onto BLM ownership. There is a good chance that *Phytophthera lateralis* will be introduced and spread from these sites. The long term impacts are the same as the No Action Alternative. Project Area F should benefit from the sanitization of roads and streams and spacing of Port-Orford-cedar. Sanitization would prevent *Phytophthera lateralis* from spreading along the high risk road and stream systems and into neighboring low risk areas as well as preventing spread between low risk sites.
Any accidental introduction of *Phytophthera lateralis* would be isolated.

Impacts on Noxious Weeds
No Action Alternative
Spread of broom and thistle on BLM lands would continue at current rates, mostly on disturbed ground along roads. Disbursed seed can become established within units from the existing mature plants and seed beds when any type of natural or human caused ground disturbance occurs. Noxious weed treatment is unlikely to be a priority in this area.

The weeds present on BLM would become a problem seed source for surrounding treated private lands. Existing seed beds would become larger and deeper, increasing the chances of spread by events other than the plants normal method of propagation. Due to the aggressive nature of noxious weeds, establishment into harvest areas will increase unless private landowners initiate control measures. Any major disturbance is likely to be overtaken by non-native plants and weeds. Broom seeds last up to 80 years in the soil and are shot up to 20 feet away from parent plants. Mature bull thistle plants produce more than 10,000 seeds per plant per year and seed viability is about 2 to 5 years. Canada thistle maintains itself through root propagation and seed viability. Canada thistle has approximately the same seed viability as bull thistle, but if the seed is buried more than 8 inches it will remain viable for up to 22 years (Sheley 1999).

Proposed Action
Direct and Indirect Effects:
The proposed action includes treatment of established weeds, setting back the seed production of mature plants and reducing the current rate of spread. Washing vehicles will help to reduce the chance of introduction of new weeds. Grass seeding of exposed soil areas will help to prevent deposited seeds from germinating by out competing them. As a result of these treatments, native plants have a better chance of becoming established and competing with any weeds that survive. Follow up treatments of plantations should target problem weeds that become established.

Cumulative Effects:
With consistent application of control measures, BLM should be able to either eradicate or significantly reduce the

introduction of noxious weeds. While logging and associated road management activities do create disturbed sites favored by noxious weeds, the result of initial and follow-up treatments should slow or eliminate their spread. Any noxious weeds present should be out competed by the seeded grass, the reestablishment of forest vegetation, and the resulting shade. Follow up monitoring and treatments of the newly established plantation should target noxious weeds. Preventing the introduction and eradicating new noxious weed species infestations is a high priority on this District and any monitoring or treatment should completely eradicate any new species. The treatments provided as a result of the logging activity make this area more likely to be monitored for future treatments.

Impacts on Fuels and Air Quality

No Action Alternative

Under the no action alternative, no direct or indirect consequences to air quality or the fuel loadings of the proposed project areas will occur.

Proposed Action

Direct:

Under the proposed action alternative, there would be an increase in fuel loadings and a greater risk of wildfire in the affected areas. The post-harvest fuel loadings will require some form of treatment for hazard reduction and to improve the site for planting by reducing logging slash and competing brush and hardwood vegetation. The fuel loadings in areas harvested by helicopter will likely have a heavier and more continuous fuel loading than those in cable logged areas. Dependent upon the final project layout, post-harvest fuel loading and the actual disposition of fuels throughout each project area, certain burn methods and burning conditions may be necessary which may not fully meet all desired objectives, primarily those regarding silviculture and hazard reduction.

Fuel loadings on adjacent private ownership greatly increase the risk of a costly wildfire. Established young stands and test sites on adjacent private lands, which are very near to the proposed project areas are of high monetary value and should an operational fire or an escaped prescribed fire occur and move onto the private lands, substantial losses could be incurred.

Regeneration harvest activities would create openings in the project areas which may mimic openings caused by naturally occurring fire.

Indirect:

Associated with the proposed action would be increased human activity which would increase the possibility of human caused fire.

Any prescribed fire activities in the project areas will be conducted in accordance with the Operational Guidance for the Oregon Smoke Management Program (ODF 1992). Winter and Spring burning will be done when the weather conditions and patterns exist that promote the rapid dispersion of smoke. Some localized, short-term accumulation of smoke may occur as a result of cooler temperatures and decreased winds associated with nighttime weather patterns.

Unit Access

Proposed helicopter yarding of units in Project Areas B, C and D would result in limited access to logged units for holding and mop up operations, thus increasing cost and the risk of an escaped fire during broadcast burn operations.

Survey and Manage Buffers

The location, size and distribution of buffer sites could make it extremely difficult to broadcast burn units and

prevent burn over of buffer sites. This is especially true on ground with severe slopes.

Impacts on Survey and Manage, Protection Buffer and Special Status Botanical Species

No Action

Without harvest, these stands would continue to follow successional stages that are typical of forests in the western hemlock /Douglas-fir vegetation zone.

Proposed Action

Removing portions of Project Area B would minimally decrease the amount of mid to late seral habitat left in the immediate area, as the existing Riparian Reserves, Survey and Manage Strategy 1 species buffers and the 100 acre northern spotted owl core considerably limit the acreage of the stand available for harvest. Harvest of Project Area A would reduce the amount of late successional habitat in the immediate vicinity.

Project Area C contains a small concentrated madrone stand (mentioned in Chapter One: Alternatives Considered but Eliminated) that would be preserved as a special habitat area. It is possible that *Rhizopogon* mycorrhizae may be present in the soil of madrone or mixed conifer/madrone stands.

Project Area C has constraints on timber availability due to adjacent northern spotted owl core and connectivity management practices (See Connectivity/Diversity Blocks in Chapter 2 for a more detailed explanation). According to the *Coos Bay District Resource Management Plan* and its Record of Decision (USDI BLM 1995), connectivity management and mitigation measures on public land would contribute to more habitat and dispersal mechanisms for late-successional species.

Project Area D has constraints on timber availability due to connectivity management practices and green tree retention requirements. Removing portions of Unit D would minimally decrease the amount or mid to late seral habitat left in the immediate area.

Removing portions of Project Area E would also minimally decrease the amount of mid to late seral habitat left in the immediate area due to riparian reserves limiting the amount of the stand available for harvest. There are patches of open, dry, and moist habitat sites on rock bands located within the riparian reserves of Unit E that could contain potential habitat for Special Status species *Adiantum jordanii*, along with other Bureau Sensitive species. See Attachment Two for habitat description.

Well distributed green tree retention and coarse woody material would contribute to stand diversity and provide inoculum to the new stand that should allow epiphytic lichens, bryophytes and some fungi to reach higher levels of species richness and abundance sooner than if these retained trees and coarse woody material were removed.

Project Area F has patches of open dry and moist habitat sites on rock bands located within the stand. These areas could contain potential habitat for Bureau Sensitive species *Romanzoffia thompsonii* along with other Special Status species. See Attachment Three for habitat description. Thinning has been observed to be associated with increased abundance of lichen biomass and increased similarity of lichen communities between young and old-growth stands (McCune 1996).

Impacts on Survey and Manage Mollusk Species

No Action Alternative

There are no known direct or indirect consequences for Survey and Manage mollusk species under the No Action Alternative. Current information indicates that these species are more abundant and wide spread than originally

thought and do not seem to be old growth dependent. They are associated with the protection and moisture provided by such things as down logs and sword fern root masses. *Megomphix hemphilli* appears to show an association with big leaf maples. The existing stand conditions would not be changed.

There are no known significant cumulative consequences for the three Survey and Manage mollusk species under the No Action Alternative.

Proposed Action

Direct and Indirect Effects:

A few surveys have been completed for Survey and Manage mollusks in Project Areas A and B. Project Area A has the first of two protocol surveys completed, and units 3, 5, and 6 in Project Area B have both protocol visits completed and unit 1 has one of two visits completed. See Attachment Seven for further information and management recommendations in these units. No surveys have been started in the other Project Areas.

Potential direct impacts could include deaths of individual mollusks as a result of harvest activities (i.e. crushing from people, machinery, falling and logging of trees) and damage or removal of existing down logs, big leaf maple or other habitat features favored by these species. Under current coarse woody material retention guidelines and adequate size and amount of class one and two logs will be left on site to enhance, maintain, or benefit species that utilize this type of habitat.

Cumulative Effects:

No cumulative negative impacts are anticipated from management activities. Management recommendations provide guidelines on retention and protection of prime sites by maintaining a relatively high level of suitable habitat conditions and features. A temporary decline in local populations of these and other mollusk species can be expected to follow a major reduction in tree canopy. But, if stand species diversity, sufficient shade and large woody debris are maintained, then in less than 20 years the habitat should regain suitability and occupancy (USDI BLM 2000).

Impacts on Wildlife

No Action Alternative

If there were no action the regeneration harvest proposed for Project Areas A, B, C, D and E would not occur and there would be no negative consequences for existing wildlife. The late successional (80 years +, about 171 acres) and old growth forest habitat (180 years +, about 14 acres) present in the areas would remain within the subwatershed and continue to provide habitat for wildlife species associated with these habitats. The late successional forest habitat present in the units would likely continue on their respective successional pathways and develop into old growth forest over time.

If the proposed commercial thinning operations for Project Areas C and F (about 837 acres) are not implemented there would be both positive and negative consequences for wildlife species. A positive aspect of not conducting thinning operations in these areas is that the stands would remain dense and some wildlife species are more abundant in these types of stands (Hayes et al. 1996). Habitat for these species would be maintained by not thinning. However thinning can generally aid the development of mature and old growth characteristics in forest stands (Curtis et al. 1998). So if the stands are not thinned there are long term negative consequences for wildlife species associated with late successional and old growth habitat. The stand characteristics associated with late successional forests could still develop but the time required for this to occur would be greater.

If neither the proposed regeneration harvest or commercial thinning projects were implemented there would be no

negative consequences for wildlife related to new road construction or any road renovation or improvement. This would be a positive benefit to wildlife as there would not be any short term increase in road densities. Other benefits would include less disturbance to wildlife and a reduction or elimination of vehicle related wildlife mortality/injury. Under the No Action Alternative, the proposed closures of existing roads would not occur. This would be a negative consequence for wildlife since closing these roads would reduce wildlife disturbance and the potential for animal mortalities and injuries.

Proposed Action

Wildlife Species

Northern Spotted Owl:

Under the proposed action about 185 acres of suitable Northern spotted owl habitat would be removed through regeneration harvest. For the Cedar Creek subwatershed this would result in the removal of 10.1% of the available suitable habitat acres. The loss of suitable Northern spotted owl habitat within the subwatershed is not significant at the subwatershed scale, however, there are direct impacts to specific spotted sites.

Regeneration harvest would affect 4 spotted owl sites on BLM land (Table Fourteen).

Table Fourteen: Effect of the proposed action in the Cedar Creek subwatershed on reducing or modifying owl habitat for affected Northern spotted owl sites on BLM land.

Northern spotted owl site[a]	Pre harvest suitable spotted owl habitat within 1.5 miles of site[b]		Suitable spotted owl habitat removed through harvest	Dispersal spotted owl habitat modified	Post harvest suitable spotted owl habitat within 1.5 miles of site	
Upper Cedar Creek	362 acres	8.0%	100 acres	0 acres	262 acres	5.8%
Callahan	271 acres	6.0%	34 acres	41 acres[c]	237 acres	5.2%
Williams Bend	543 acres	12.0%	18 acres	0 acres	525 acres	11.6%
Williams River	588 acres	13.0%	0-18 acres maximum[d]	0 acres	570-588 acres[d]	12.6-13.0%
Tioga Creek	498 acres	11.0%	0 acres	35 acres[e]	498	11.0%

[a] All sites except the Williams Bend site are considered permanent sites and have produced young at least once since they have been monitored. The Williams Bend site is a temporary owl site. A pair has been present since monitoring began but there has not been any successful reproduction at the site.

[b] Estimates from USFWS data analysis in 1995 and only includes acres on BLM land; data for adjoining private lands not available.

[c] Thinning of stand within 1.5 miles associated with Project Area C. Thinning for Project Area C is in 41 acre stand predominantly 60 years old with 90 year old residuals so it is at least dispersal habitat and possibly provides some suitable habitat.

[d] There would be no suitable habitat removed from this site if Unit 3 of Project Area D was harvested but there would be 18 acres removed if either Unit 1 or 2 of Project Area D was cut.

[e] Thinning of stand within 1.5 miles associated with Project Area F. Stand being thinned is 40-42 year old conifer stand so it is strictly dispersal habitat.

Habitat lost for these sites ranges from 18 to 100 acres (Table Fourteen). The Upper Cedar Creek site would be impacted the most since it would lose the most habitat and the Williams River site would be the least impacted since there might not be any harvest within the home range radius of this site, and the core area occurs in a Late Successional Reserve, while the other 3 sites affected by habitat removal are all in the Matrix (Table Fourteen).

Habitat loss would have a greater effect on the Callahan and Upper Cedar Creek sites than the Williams Bend site as spotted owls have nested successfully at these sites whereas this is not so for Williams Bend.

Habitat loss would affect some BLM spotted owl sites, however, the U.S. Fish and Wildlife Service has generally considered sites that have less than 40% suitable habitat remaining within their home range radius to not be viable. All of the owl sites that would be impacted by the proposed action are already well below this threshold with a range of 6-13% (Table Fourteen). At some point further reductions in suitable habitat for the Upper Cedar Creek, Callahan and Williams Bend sites could preclude any possibility for nesting. Northern spotted owl 100 acre core areas have been delineated for the Upper Cedar Creek and Callahan sites in compliance with the Northwest Forest Plan standard, so at a minimum, 100 acres of suitable habitat would be maintained at these sites. The Williams Bend site does not have a 100 acre core area designated as it did not fit the criteria (Interagency 1994) and so the core area could be removed through regeneration harvest. Under the Northwest Forest Plan, northern spotted owl sites that occur in the Matrix are not considered to be viable over the long term and are not expected to contribute to the long range conservation or recovery of the species. While some individual owl sites may be affected by the proposed action the effects at the Northwest Forest Plan level are not significant. Under the Northwest Forest Plan, northern spotted owl population viability and dispersal would be maintained primarily through the designation of Late Successional Reserves and Riparian Reserves.

Some of the removal of spotted owl habitat also would occur within the home range radius of 2 spotted owl sites on private land within the subwatershed. However the habitat losses are relatively small with one site losing 15 acres and the other 18 acres. There would not likely be significant effects for either site given the low amount of loss and that in both cases it would occur near the periphery of their home range area well away from the site centers.

The proposed action also includes 837 acres of commercial thinning. Most stands 31 to 80 years old provide dispersal habitat for the spotted owl so thinning the areas would modify 11% of the available dispersal acres in the South Fork Coos Watershed (Table Fifteen). At the subwatershed level, 80% of available dispersal habitat would be modified. Given the high proportion of available dispersal acres treated, the proposed thinning projects could appreciably affect spotted owl use of these areas on BLM land. Some of the thinning would occur within the home range radius of BLM owl sites (Table Fourteen) and about 40 acres of it would occur within the home range radius of an owl site on private land.

In general, thinning the 837 acres as proposed may affect the spotted owl as all of the acres to be treated are dispersal habitat for the species and there are many spotted owl sites within the subwatershed and on it's periphery. Dispersal likely occurs as owls move away from site centers in the Cedar Creek subwatershed. Spotted owl dispersal also likely occurs as they move through the Cedar Creek subwatershed while traveling between Late-Successional Reserves 261 and 263.

Table Fifteen: Summary of the effect of the proposed action within the Cedar Creek subwatershed in modifying/reducing available acres at the watershed and subwatershed level for BLM lands only.

Treatment Acres in Cedar Creek proposed timber sales	At South Fork Coos 5th field level- Percent of available acres treated	At Cedar Creek subwatershed level- Percent of available acres treated
837 acres thinning[a] in stands 31-80 years old	837 of 7,589 = 11.0%	837 of 1,046 = 80.0%
171 acres regeneration harvest in stands >80-200 years old	171 of 4,874 = 3.5 %	171 of 633 = 27.0%
14 acres regeneration harvest[b] of stand 200+ years old	14 of 8,644 = 0.2%	14 of 593 = 2.4%

[a] This is the total for thinning acres in Project Areas C and F in stands predominately about 40 years old and 60 years old respectively.

[b] Estimate of portion of Unit 3 of Project Area B that is 200+ years old.

Modifications to dispersal habitat in the short term (less than 10 years) could result in increased spotted owl predation as treated stands would be more open, at least until canopy closure occurs, so great horned owls and other predators would have greater access to the areas. These changes also would likely be positive in that the reduced tree densities in the thinned stands would allow spotted owls to move through them more readily. This benefit would probably be greater for Project Area F as tree densities now are very high there. Over the longer term (10 or more years) thinning would likely contribute to improved Northern spotted owl dispersal conditions in the subwatershed. Thinning would allow trees to develop larger diameters and bigger crowns than if the stands remain unthinned. After a few years the canopy would close again and spotted owl predators would not have ready access to the stands anymore.

Although a large amount of available dispersal acres on BLM land would be treated through the proposed thinning projects, BLM actions within the subwatershed would not have a significant effect on dispersal habitat for the area as a whole since most of it (90%) is in private ownership. Weyerhaeuser Company is the primary landowner. Given that they have agreed to achieve and maintain a landscape condition where 80% of the area provides owl dispersal habitat and gaps would be kept to less than 0.5 miles (WEYCO 1994) the subwatershed should function reasonably well for owl dispersal.

Marbled Murrelet:
The proposed action would remove about 48 acres of suitable habitat and potentially modify another 16 acres through thinning. For the Cedar Creek subwatershed, this would mean that 3.6% of available habitat acres would be lost or modified. There should not be any effects to the marbled murrelet from implementing the proposed action since areas of suitable habitat have either been surveyed and found to not be occupied or they will be surveyed to make this determination. If project areas are found to be occupied murrelet habitat protection measures of the NFP will be implemented and these areas would not be harvested. The effect of removing murrelet habitat (unoccupied habitat) from the Matrix was analyzed in the NFP. The retention of Late Successional Reserves, Riparian Reserves, and establishment of reserves for occupied sites in the Matrix are expected to provide sufficient nesting habitat to maintain viable murrelet populations at the landscape level.

Bald Eagle:
Under the proposed action 18 acres of potential bald eagle habitat would be removed. However no nests or roosts have been located in the area where the potential habitat occurs. If a nest or roost was located, protection measures under the Pacific Bald Eagle Recovery Plan would be implemented. The NFP assumed that compliance with the Pacific Bald Eagle Recovery Plan (USFWS 1986) would assure the viability of this species. The proposed action may affect the bald eagle through removal of some suitable habitat in one area of potential future use but overall the action would not affect this species.

Peregrine Falcon:
The proposed action should not affect the peregrine falcon. There are no known peregrine falcon nest sites present in or near the project areas. If a nest were discovered, it would receive protection under current BLM protocols for managing peregrine falcon nest sites.

Other Special Status Species:
The proposed regeneration harvest would affect some Special Status Species listed in Attachment Seven. Many are associated with late-successional forests or their components and regeneration harvest would remove or degrade

habitat for these species. There could be some direct mortality or injury to these species as a result of harvest and site preparation activities. Snags that serve as habitat for the northern pygmy owl, northern saw-whet owl, pileated woodpecker, silver-haired bat, fringed myotis, long-eared bat, long-legged myotis and Yuma myotis could potentially be lost either during felling and yarding or during post-sale burn operations. Existing down log habitat for the clouded salamander could also be lost during project operations. The effect to these species would be to at least reduce their populations in the immediate harvest area. Using green trees to buffer existing snags and down logs in the units and retaining additional green trees could partially offset the loss of these features during harvest and burning operations but these measures would not fully compensate for their loss. Impacts to these species at the landscape scale were mitigated by the NFP. Species like the white-footed vole, southern torrent salamander, western toad and northern red-legged frog are less likely to be impacted by the proposed action since they tend to be associated with habitats in riparian areas which would be protected in Riparian Reserves.

The proposed commercial thinning operations also would likely affect many of the Special Status Species listed in Attachment Seven. Thinning can move stands out of the closed canopy stage and accelerate the development of conditions found in late seral forests (Hayes 1996). Many of the Special Status species known or suspected to occur in the subwatershed are associated with late-seral forest habitat (Brown1995, USDI BLM 1999). More specifically thinning can improve stand conditions through the development of larger diameter live trees, by increasing crown lengths, by allowing larger branches to develop and providing the opportunity to improve tree species diversity (Hayes 1996). Thinning also can move a stand to the understory reinitiation stage, allow for the creation of canopy gaps and generally aid the development of mature and old growth characteristics in stands (Curtis 1998). There would likely be some short term negative consequences associated with thinning the stands, such as allowing predators of some Special Status Species greater access into stands, but the long term effects would be positive.

Survey and Manage Wildlife Species:
The Federal agencies responsible for implementing the NFP are in the process of amending the standards and guidelines for Survey and Manage and Protection Buffer Species and other species-specific management directions contained in the NFP (USDA and USDI 1999). The survey requirements and mitigations described in this section are primarily based on the current NFP requirements for these species. These requirements and protection measures will be adjusted, as appropriate, in accordance with any future changes in the standards and guidelines.

The proposed action would result in the removal of 185 acres of red tree vole habitat and the modification of another 837 acres of habitat for this species. However, it is currently required that all project areas be surveyed for the red tree vole and if sites are discovered they will be managed in accordance with the current recommendations approved by the Regional Ecosystem Office. Under the NFP, the Late-Successional Reserves are the main strategy in providing sufficient habitat to maintain well-distributed red tree vole populations and assure it's viability on the landscape. Appropriate buffers around discovery sites in the Matrix supplement the Late Successional Reserves in conserving the species, therefore; habitat loss or modification should not affect the red tree vole.

It is unlikely that the proposed action would affect the Del Norte salamander. Under current protocol, the one project area within the range of this species would be checked to determine whether the appropriate habitat is present. It is possible requirement to conduct surveys for this species, prior to ground disturbing activities will change when the Supplemental Environmental Impact Statement for Survey and Manage and Protection Buffer Species (USDA and USDI 1999) is finalized. If there is Del Norte habitat present and surveys are still required, this area will be surveyed and if any of these salamanders are found the sites would be managed under appropriate protection guidelines.

Protection Buffer Species:

The five bat species that are Protection Buffer Species under the NFP could generally be affected by regeneration harvest or commercial thinning but, with regard to the additional protection measures currently identified in the NFP there would be no effect to these bats. If there are any caves, mines, or abandoned wooden bridges or buildings in or near the proposed project areas, they will be surveyed for presence of these bats. If any of these bats are present the site would receive the appropriate level of protection in accordance with the most current Management Recommendations (USDA and USDI 1994, USDA and USDI 1999).

Other Wildlife Species:
A wide variety of other wildlife species that are not Special Status Species, Survey and Manage Species or Protection Buffer Species and are associated with late-successional forest habitat could occur in the areas proposed for regeneration harvest. These species include salamanders, several species of migratory birds, woodpeckers, and small mammals such as voles, shrews, squirrels, and bats. Regeneration harvest would remove some habitat for these species.

Migratory birds and/or their nests could be destroyed if harvest occurs during the spring and summer nesting season for these species. For units where it is feasible to do so, this impact could be mitigated by conducting harvest operations in the fall and winter months. Tree squirrels and tree voles could also be impacted by felling of trees during harvest. Snag habitat for woodpeckers, bats, chestnut-backed chickadee and northern flying squirrel and down log habitat for salamanders and small mammals such as mice, voles and woodrats could be lost or damaged during cutting and yarding operations or when burn projects occur. The affect to these species would be to at least reduce their populations in the sale area. Using green trees to buffer existing snags and down logs in the units and retaining additional green trees could partially offset the loss of these features during harvest and burning operations but it probably will not completely mitigate the loss. Impacts to these species from regeneration harvest were mitigated at the landscape scale under the NFP. The NFP provides and interconnected system of Late-Successional Reserves, Riparian Reserves, other unmapped reserves and protection measures that together ensure that these species are adequately conserved.

Commercial thinning operations would also affect wildlife species using forested habitats in the subwatershed. For those that are associated with late-successional forests, the thinning would be beneficial as previously discussed under the Special Status Species section above. Other species use the dense mid-seral forest habitats the proposed thinning units provide and may prefer this habitat. Pacific slope flycatchers are less abundant in thinned stands (Hager et al. 1996). Sharp-shinned and Cooper's hawks also utilize dense conifer stands for nesting and foraging. Thinning these areas would negatively affect these species in the short term.

Wildlife Habitat
Loss of Late-Successional Forest Habitat
About 171 acres of late-successional habitat would be removed through regeneration harvest in association with the proposed action (Table Fifteen). This equates to 3.5 % of the late successional forest habitat in the South Fork Coos watershed and 27% of this habitat in the Cedar Creek subwatershed (Table Thirteen). About 14 acres of old growth forest habitat would be removed through regeneration harvest (Table Thirteen). For the South Fork Coos watershed this amounts to 0.2% of the available old growth and at the Cedar Creek subwatershed level the loss would be 2.4% of this habitat type (Table Fifteen). Hence the greater impact is the loss of late successional forest habitat as old growth forest removal would be proportionately much less at both watershed scales.

The proposed regeneration harvest would remove portions of late-successional forest that currently provides habitat for northern spotted owls and marbled murrelets and, in the case of Project Area D, potential bald eagle habitat. Suitable habitat for other Special Status Species, Survey and Manage Species and a variety of other wildlife

species associated with late-successional forest also would be removed through the proposed action. Species in Attachment Seven that this could impact include: northern pygmy owl, northern goshawk, northern saw-whet owl, pileated woodpecker, all of the bat species, marten, fisher, clouded salamander, western toad, and tailed frog. Other wildlife species that are not Special Status Species utilize late successional forest habitat and could be affected by the proposed action. Cutting also would remove the stand structural complexity that is associated with these older forest habitats especially the vertical component. The early successional forest habitat that would replace the existing late-successional habitat after harvest is complete would have much less structural complexity.

The loss of habitat for late-successional forest wildlife species from Matrix lands is consistent with the NFP ROD (Interagency 1994). The loss of this habitat was mitigated through the designation of Late Successional Reserves, Riparian Reserves, spotted owl 100 acre cores, reserves for occupied murrelet sites and buffers for Survey and Manage and Protection Buffer Species (Interagency 1994). Analysis provided in the Final Supplemental Environmental Impact Statement (Interagency 1994) indicates that the loss of late-successional forest habitat in the Matrix is not expected to affect the viability of species associated with this habitat.

Loss and/or Reduction in Connectivity
Both regeneration harvest and commercial thinning in the subwatershed would affect connectivity habitat. Connectivity habitat generally consists of stands that allow wildlife species to move successfully through the landscape between late successional forest habitat areas and provides some protection from predators and weather extremes.

One type of effect regeneration harvest would have is on specific areas designated as Connectivity Blocks under the NFP (Interagency 1994, page C-42). Regeneration harvest would affect the Callahan Ridge Connectivity block (#18) and the Williams River Connectivity block (#20). For the Callahan Ridge block connectivity habitat would be reduced by 12.1% through removal of 34 acres and in the Williams River block it would be reduced by 10.3% through removal of 18 acres. The other effect regeneration harvest would have on connectivity habitat is through removal of other late-successional forest stands in areas that provide this type of habitat but were not formally designated as Connectivity Blocks under the NFP. Through regeneration harvest another 135 acres of connectivity habitat would be lost in Project Areas A, B, and E. The overall effect of the regeneration harvest would be to fragment these late-successional stands where harvest would occur and reduce, but not eliminate, available connectivity habitat.

The reduction in connectivity habitat in the Matrix area is consistent with the NFP. Mitigating measures which offset it's loss in Connectivity blocks include maintaining 25-30% of the area as late-successional forest habitat, harvesting on a 150 year area control rotation, and leaving 12-18 green trees in harvested areas (Interagency 1994). For areas in the Matrix not formally designated as Connectivity Blocks, but that still provide connectivity habitat, the loss of this habitat is mitigated in several ways. These include: retention of some green trees, snags, and down log habitat in harvest units, retention of 100 acre core areas for some spotted owl sites, retention of habitat around marbled murrelet occupied sites, and buffering known locations of Survey and Manage and Protection Buffer species where appropriate (Interagency 1994). However, under the NFP a basic assumption is that the main connectivity habitat needs of wildlife species are to be largely provided for by the Riparian Reserve network.

The proposed commercial thinning for Project Areas C and F would also likely affect connectivity habitat. For Project Area F the effect is for Matrix lands, whereas for Project Area C, a designated Connectivity Block would be affected. For both areas, the overall effect of treatment would be modification of connectivity habitat at most. The stand to be treated at Project Area C is older that the stands that make up Project Area F. So this stand probably provides better quality connectivity habitat than the stands comprising Project Area F, but these younger stands undoubtedly provide some value as connectivity habitat for wildlife species. However the stands at Project Area F

may not provide much connectvity value for the spotted owl and some other wildlife species associated with late-successional forest. This is because these stands are very dense and could inhibit movement by some species. The short term effects of commercially thinning these stands for some wildlife species would be to increase exposure to both predators and weather although the stands would continue to provide some protection from both. This short term negative effect for some species would likely be ameliorated over the longer term. The canopy of these stands would close again eliminating the short term increased exposure to predators and weather and the lower tree densities would improve the ability of wildlife species to move more readily through the stands.

Dispersal Habitat Modifications

The proposed commercial thinning operations would affect dispersal habitat for wildlife species within the Cedar Creek subwatershed. The areas that would be thinned are old enough to provide dispersal habitat value for the northern spotted owl and many other wildlife species associated with late successional and old growth forest habitat. The combined area of treatment associated with the proposed thinnings represents 11% of the available dispersal acres in the South Fork Coos watershed and 80% of the available dispersal habitat in the Cedar Creek subwatershed when considering BLM lands only (Table Fifteen). At the subwatershed scale thinning 80% of the available acres of stands 31-80 years old may appear to have an appreciable effect on dispersal habitat conditions when considering only the BLM ownership within it. However, as previously mentioned, 90% of the subwatershed is privately owned, so the proposed action in this context would probably not have a large effect on overall dispersal habitat conditions within it. Given that Weyerhauser owns most of the private land in the subwatershed, and that they have agreed to achieve and maintain a landscape on their lands conducive to the dispersal of juvenille spotted owls (WEYCO 1994), this area should function reasonably well with regard to providing dispersal habitat for late-successional and old-growth associated species.

The thinning projects would modify but not eliminate dispersal habitat functions for these areas. In both areas tree densities would be reduced. But in each case, canopy closure would remain at the 60-70% level post treatment. The short term effects for wildlife from thinning would be both negative and positive. Thinning will open up the canopy creating greater access to the stands for predators such as great horned owl and American crow than previously existed. Late successional forest species dispersing through these areas would be more exposed to predation. But the canopy would close again within about 10 years and then this would no longer be a concern. Thinning can have positive effects by opening up the stands through a reduction in tree densities and allow many wildlife species to disperse through them more readily. This would be especially true for Project Area F as current tree densities are quite high in these stands.

Overall, considering both the positive and negative aspects of thinning for a range of wildlife species, the net effect of the proposed action over the longer term would probably be positive. Dispersal is generally a concern for many of the highly mobile species associated with late-successional and old-growth forests and thinning would allow many of these species to disperse more readily through the forest landscape. Also, as previously discussed, thinning can accelerate the development of characteristics found in late successional forest stands.

Loss of Snag and Down Log Habitat

Existing snags will be lost or damaged during felling and yarding activities associated with timber harvest and during post sale burning operations. Loss and/or damage would be greatest for operations related to the 185 acres of regeneration harvest. Some snag loss and/or damage also would be expected to occur in conjunction with the 837 acres of commercial thinning operations, however; these snags will usually be small diameter suppressed trees. Some snags not protected within green tree retention patches are likely to be knocked over during tree felling and yarding. Others will be cut during the operation because they pose a safety hazard to workers. In the regeneration harvest areas, snags will be exposed to further risk during post harvest burn operations and could be damaged by

having their roots destroyed, bark could be charred or the snag could be partially or entirely consumed by the fire. The loss or damage to snags that would occur under the proposed action would be a greater impact in the regeneration harvest areas than in commercial thinning areas. Commercial thinning stands typically would not have adequate snag resources to support cavity-nesting birds at 40% of potential population levels anyway given teir relatively young age.

The loss or damage of snag resources would be expected to impact many of the Special Status Species listed in Attachment Seven. This could include northern spotted owl, northern pygmy owl, northern saw-whet owl, western bluebird, pileated woodpecker, all the bat species and the American marten. Other wildlife species that are not Special Status Species are dependent on snag resources and could be affected by the proposed action. Populations of these species will likely decline within the area as this habitat is lost.

Down log habitat also will be lost or damaged during felling and yarding activities associated with timber harvest and during post sale burning operations. Loss and/or damage would be greatest for operations related to the 185 acres of regeneration harvest. Some loss and/or damage of down log resources also would be expected to occur in conjunction with the 837 acres of commercial thinning operations, however; most of the material is reserved from harvest. For the regeneration harvests, some down logs not protected by green tree retention patches will be damaged as trees are felled on top of them causing them to break up. They could also be broken up during yarding operations or have bark removed or their position in the unit could be altered. The net effect is that down log habitat that is damaged during harvest operations will lose some or all of it's ability to function as wildlife habitat. The greater the damage the less valuable it will be as wildlife habitat. As an example, Class 1 and 2 down logs could be degraded to the point where they might not be able to develop into Class 3 logs with loose bark.

During broadcast burning operations, associated with regeneration harvest units, down logs would be subjected to the direct influence of fire. This may char or consume the bark of down logs or the litter adjacent to them, cause fire hardening of the log. Down logs could also be partially or completely consumed during these operations. Down logs subjected to fire would likely be greatly altered and their value as wildlife habitat degraded or eliminated. The potential for fire-related impacts to down logs is greater in units that will be broadcast burned than those where machine or hand piling and spot burn operations will be conducted. The amount of loss or damage can be better controlled with the pile burning operations.

Under the proposed regeneration harvest operations all Class 3, 4, and 5 down logs are to be retained. But timber cutting and yarding activities and post sale burn operations would cause the loss or degredation of some of this habitat. This impact can be lessened but it is unavoidable at some level. The net effect is that there would be both a net loss of this material and a decline in it's quality as wildlife habitat after all harvest related actions are complete. In all regeneration harvest units there will be a minimum of 120 lineal feet per acre of Class 1 and 2 down log material after sale operations ad burning are complete. Although the NFP standard would be met for these units, some could have more than 120 lineal feet per acre in Class 1 and 2 material present before harvest related actions occur. The net effect for these units is that while NFP standard is met there could be a net loss of this material and a decline in it's quality in comparison to pre-harvest stand conditions. In Project Areas A, B, C, and E Class 1 and 2 down logs will not be retained in the units, but rather extra standing green trees will be retained and then felled after the burn operations are complete to provide the 120 feet per acre minimum. This may assure that the requirement for the NFP minimum is met and that the trees to be felled would likely be in good condition. However there would still be a lag time for the units, from the time before harvest occured when the material was present and providing wildlife habitat to the time when the extra retained standing trees were felled (post burn) became and ecame functional as down log habitat.

The loss or damage of down log resources would be expected to impact many of the Special Status Species listed in Attachment Seven. This could include northern spotted owl, northern pygmy owl, northern saw-whet owl, pileated woodpecker, all the bat species, American marten, clouded salamander, northern red-legged frog and sharptail snake. Other wildlife species that are not Special Status Species utilize down logs and could be affected by the proposed action. The loss of down logs in the sale area will affect species dependent on this resource. Populations of these species will likely decline within the area as this habitat is lost. Buffering existing down logs with green retention trees would help minimize losses during burn operations.

Cumulative Effects

The cumulative effects related to the loss of late-successional forest habitat were analyzed at the landscape level for Threatened and Endangered species, Special Status species, Survey and Manage species, Protection Buffer species, and all other wildlife associated with these forests in the Final Supplemental Environmental Impact Statement (Interagency 1994) for the NFP. Cumulative effects at the landscape scale have been mitigated in the NFP. The Late Successional Reserves were allocated under the NFP to provide habitat for late-successional related species. Riparian Reserves, 100 acre Northern spotted owl cores, reserves associated with Marbled Murrelet occupied sites and other Matrix reserves also serve to mitigate harvest effects on late-successional species.

There also are cumulative effects at the local or subwatershed level that are associated with the proposed action. Regeneration harvest will remove and/or degrade late-successional forest habitat in Matrix lands within the Cedar Creek subwatershed. The effects will vary for different wildlife species.

For larger, more mobile, wildlife species associated with late-successional forest, such as the spotted owl, the late-successional forest habitat present in the Matrix area of this subwatershed will generally not support viable populations since the habitat occurs mostly as scattered, relatively small blocks. These species have large home ranges and require much larger habitat blocks, provided by the Late-Successional Reserves, to meet all their life requirements. Late-successional habitat blocks present in the Matrix will generally provide these species with some temporary feeding, resting and roosting opportunities. These blocks also provide some connectivity function since they aid movements by these wider ranging species through Matrix lands from one LSR to another. Over time the harvest of late-successional habitat in the Matrix will reduce but not eliminate these habitat values since Riparian Reserves and some green trees, snags and down logs in sale units will remain in the Matrix after harvest. For larger, more mobile wildlife species the loss and/or degradation of late-successional habitat in the Matrix is not likely to have long term effects for their populations given that Late-Successional Reserves, Riparian Reserves and other types of reserves will be present on the landscape.

For smaller, less mobile, wildlife species that have small home ranges, such as amphibians and small mammals, the effects are different. The existing late-successional habitat blocks present in the Matrix lands can provide for all of their life requirements and therefore can support their populations. The loss and/or degradation of the remaining late-successional habitat blocks in the Matrix that is associated with timber harvest will have a greater impact on local populations. As harvest of late-successional forest habitat continues, over time populations of these wildlife species will be either reduced or lost from Matrix lands in the subwatershed. However, at a wider landscape scale the loss of these local populations is not expected to affect the long term population viability of these species given the many conservation provisions of the NFP.

The cumulative effect of commercial thinning would be to modify existing mid-seral habitat on Matrix lands within the subwatershed. The effects will vary for different wildlife species. For species associated with dense mid-seral stands, like the sharp-shined hawk, thinning may result in decreased use of treated stands or lessen the period of time they are in optimal condition for them to use. These species habitat preference is for high density stands that

maximize cover. Thinning would probably not preclude use of these stands by these species.

For other wildlife species that prefer lower density stands with late-successional forest characteristics, such as bats, thinning should result in increased use of the treated stands and hasten the development of habitat conditions they prefer. These species are likely inhibited from using high density mid-seral stands as high tree densities restrict movement through the stands. Also dense mid-seral stands are lacking in stand structural diversity, understories, large diameter trees, canopy gaps and other structural characteristics associated with late-successional forest.

Under the NFP it is anticipated that there would be some regeneration harvest and commercial thinning actions on BLM GFMA and Connectivity lands over time within the Cedar Creek subwatershed. It is not possible at this time to assess the amount or rate of this kind of activity given current uncertainties associated with Survey and Manage species and Protection Buffer species. Assuming some of these timber harvest actions will take place on Blm land over the long term, there will continue to be some effects on wildlife species within the subwatershed in association with these projects. However, given that Blm lands only comprise about 10% of the Cedar Creek subwatershed, while roughly 90% of it is in private ownershipl the greatest overall effect on wildlife populations within this area will be in relation to harvest of these private lands. These private lands are industrial forest and it is likely that these will continue to be aggressively harvested for forest products.

Impacts on Hydrology (Water Quality) and Channel Morphology

No Action Alternative

Direct Affects

No direct affects are anticipated from this alternative.

Indirect Affects

Riparian shade will continue to increase on those reaches that have not yet reached or matured to their potential condition. Annual yield, low flows, and peak flows will be unaffected by maintaining present forest conditions.

Cumulative Affects

Same as indirect affects.

Proposed Action

Direct and Indirect Affects

Annual Yield

Forested areas on the Coos Bay District can use large amounts of water to satisfy evapotranspiration demands. It is common in western Oregon, for evapotranspiration to be in excess of 25" annually. However, site conditions determine how much evapotranspiration will actually occur, and depends on slope, aspect, soils, type of vegetation and climatic conditions. A 1979 study by Harr in western Oregon showed annual water yield increases to be in the range of 8-25" for a regeneration harvest. Largest increases in water yield occur in the fall and spring, when maximum differences in water storage exist (Harr 1976). Estimates of potential water yield increases from large forested watersheds are in the range of 3-6%, assuming the use of 70-100 year rotation intervals (Harr 1983). After examining 90 watershed studies worldwide, Bosch and Howard (1982) determined that water yield increases are usually only detected when at least 20-30% of the watershed has been harvested. Additionally, Harr (1979) found that the regrowth of shrubs and small trees commonly returns rates of evapotranspiration to prelogging levels within about five years, while other studies (Keppeler and Ziemer 1990, Ziemer et. al. 1996) found that water yields returned to near prelogging condition within a range of 1 to 8 years following harvests.

Much of the research on the affects of timber harvest on water yield was done by studying the affects of harvesting

entire small watersheds and involved treatments that went from ridgetop to creek edge. Little research has been done in the Pacific Northwest looking at the affects of partial cuts, thinnings, patch cuts or the affect of clearcutting while retaining streamside buffers on water yields. However, an average annual yield of 2.4 inches was detected for four years after a shelterwood cut, where 50% of the basal area was removed from a southwest Oregon Cascades watershed. A patchcut watershed, which had 20 small clear cuts totaling 30% of the watershed resulted in an average water yield increase of 3.5 inches (Harr et. al 1979 cited in Reiter and Bestch 1995). Where individual trees or small groups of trees are harvested, the remaining trees will generally use any increased soil moisture that becomes available following timber harvest. Because of such "edge effects", partial cuts, light shelterwood cuts, and thinnings are expected to have little effect, if any, on annual water yields.

Trees in the Riparian Reserve intercept, take-up, and transpire the water in the soil that is made available by up slope harvest activities in the Matrix. For example, a single mature pine tree in the northern Sierra Nevada depleted soil moisture to a depth of about 6 meters and a distance of 12 meters from the trunk. This one tree transpired about 88 cubic meters more water than a surrounding logged area. This summer transpiration loss is equivalent to about 180 millimeters of rain over the affected area (Ziemer 1968). Also, Chen (1991), in his study of edge effects on microclimate patterns, found that edge effect, with respect to soil moisture, was not detectable at distances greater than 197 to 295 feet (distance depended on aspects) into the stand from the stand's edge against a recent clearcut. This suggests the hydrologic response of a landscape, where Riparian Reserves are employed, may be very different from the response of watersheds that are denuded from ridge top to creek as part of research projects.

The units are well distributed through 3 of the 5 drainages throughout the Cedar Creek subwatershed in Upper Cedar Creek, Middle Williams River, and Goose Gulch. Current GIS derived vegetative age class distribution indicates 3.2% of BLM lands in the subwatershed are in the 0-30 year old (hydrologically immature) age class based on 1993 Landsat Data (USDI BLM 1999). Information on age class for private lands was unavailable. The amount of regeneration harvest under this proposed action would reset only 5.5% of BLM lands in the subwatershed to the 0 year old age class or less than 0.5% of the subwatershed lands. Additionally, 26.3% of BLM lands or 2.6% of the total subwatershed lands would be thinned. This is very similar to the no action alternative.

Road construction removes forest vegetation and reduces the amount of evapotranspiration in the affected portion of the watershed. For western Oregon, annual evapotranspiration amounts of 25 inches are common. However, this is not all available for runoff because of increased evaporation from roads and soil detention storage in areas receiving runoff water. Besides the amount of the roads in the watershed, road position within the drainage and topography, also plays an important role in actual direct contribution of flow. Ridge top roads and midslope roads typically constitute approximately 80% of all roads in area watersheds. Nearly all of the runoff generated from ridge top roads and a majority from midslope sources, is diverted back into the forest floor for infiltration by means of ditch relief culverts. Therefore, the potential percent increase in annual yield directly generated from roads would most likely be under 1%. Any impacts from new construction would be insignificant due to ridgetop positioning, advanced engineering designs, revegetation and small amount of road miles. A net loss of 2.31 miles of road is also proposed under this alternative, through the closure of existing permanent roads. Though these closed roads will stillhave some impact by slightly increasing compaction in the subwatershed, revegetation on the new roads as well as reestablished and improved drainage will most likely lead to no additional water yield to the subwatershed.

Low Flows

Low flows may initially increase, following timber harvest in the analysis area, but the effect is short lived (5-10 years). In addition,the absolute difference in additional quantities of stream flow is small (Harr and Krygier 1972, Hall et. al. 1987), and may even be beneficial to fish during the summer when temperatures are high and flows are lowest . This is due to the fact that water temperature change produced by a given amount of heat (direct solar radiation,

longwave radiation, convection and stream bed conduction) is inversely proportional to the volume of water heated, in other words, the discharge of the stream (Brown 1983). Vegetation left in place through the use of buffer strips can use up additional up slope water as stated above. Over time baseflows can actually decrease if more consumptive riparian species occupy near stream areas (Hicks et. al. 1991).

Peak and Extreme Flows

Extreme peak and minimum flows in the low elevation coast range, are dependant on climatic patterns rather than vegetation manipulation. Following timber harvest, peak flows during fall and spring periods are likely to be increased primarily due to reductions in transpiration and interception losses following harvest (Jackson 1984 cited in Reiter and Bestcha 1995). However, fall and spring peak flows are generally considerably smaller than the larger peak flows that typically occur during large storms in midwinter.

Peak flows after regeneration harvest have also been a subject of continuing controversy. By definition a peak flow is the instantaneous maximum discharge that is generated by an individual storm. The magnitude of the annual peak flow is highly variable from year to year because of the randomness of precipitation events. A frequency analysis is usually done to establish the relationship between the size of the event and it's return period. In one hydrologic study where a stream buffer of 50 to 100 feet on each side of the stream was employed along the main channel, nearly 25% of a 750 acre watershed was clearcut. The clearcut area was divided into three harvest units, each averaging 62 acres. No changes in peak flows were observed, even during fall and spring storms (Hall et. al. 1987). Thinning and regeneration harvests under this proposed action are also widely dispersed across the subwatershed, and along with the use of Riparian Reserve buffers, will most likely result in no measurable changes in peak or base flows.

In Cedar Creek peak flows are predominantly generated by rainfall events. This is because nearly all of Cedar Creek watershed is located within the rain dominated elevations below the transient snow accumulation zone. In a literature review comparing studies of nine rain-dominated coastal streams, eight showed an increase in peak flows following harvest and one showed a decrease. In over half of these studies winter peak flows increased, and the smaller fall and spring peak flows increased in eight of the nine studies. The magnitude of change range from a -36% to a +200% (Reiter and Bestcha 1995). These studies considered only small drainages (30-1000 acres), and did not consider timing and synchronization or desynchronization effects as water routes through larger mainstem streams. These studies did not consider the distribution of harvest units throughout the watershed. In three of these studies, the peak flow increases were not statistically significant.

All of the proposed harvest areas (A-F) contain some acreage within the transient rain-on-snow elevation zone. About 118 acres of planned regeneration units or 0.3% and 850 acres of commercial thinning or 2.4% of the Cedar Creek subwatershed lies above 1800 feet in elevation. This additional area is minor and would have little measurable effect on flood discharge, should the right set of climatic circumstances occur.

Roads can increase peak flows when more than 12% of a watershed is occupied by roads or compacted (Harr 1976). Roads can intercept hillslope subsurface flow and act as extensions of the stream network and route water faster to streams. However, significant ditch flow in Cedar Creek subwatershed has only been observed for very large climatic events; they normally are dry or carry little water. Roads in Cedar Creek, occupy only a minor part of the subwatershed (3.53%), and do not appear to be causing increases in peak flow.

In summary, patterns of existing regeneration harvest may be causing some small increases to winter peak flows, particularly in small tributary drainages. However, larger floods, such as the November 18, 1996 storm, overwhelm any small increase in flow due to removal of forest vegetation and/or present road density levels. Additionally, these first fall peak flows are usually small and geomorphically inconsequential in the coast range. The large peak

flows, which tend to modify stream channels and transport most of the sediment, usually occur during mid-winter after the soil moisture deficits have been satisfied in both the logged and unlogged watersheds. These large events were not significantly affected by logging in the H. J. Andrews (Rothacher 1973), Alsea (Harr 1976, Harris 1977), or Casper Creek (Ziemer 1981) studies.

Channel Response to Flow
The majority of the stream miles in Cedar Creek subwatershed are not sensitive to increases in flow. Steep Rosgen headwater A type channels are static and neither improving nor degrading (Rosgen 1994). Mid-gradient B type channels with rock or coarse woody material control are stable, even with increases in flow. Down valley reaches or occasional flats include low gradient C type channels. These channels will continue to be stable and neither improving nor degrading. C channels that have down cut and converted to F type channels, mostly along lower mainstem Cedar Creek and the Williams River, will continue to be unstable and provide sediment inputs by bankcutting during large storms.

Water Quality
Water quality will continue to be affected by some sediment delivery from old roads and natural surface roads. Sediment delivery from streamside mainline roads and episodically from mass wasting event will continue at present rates as long as present haul traffic levels and road surface conditions persist. Old rusting out stream crossing culverts and underspaced ditch relief culverts may also be a source of sediment delivery or failure, if not corrected. Overall, water quality will continue to be affected by some sediment delivery from existing old roads and natural surface roads, but levels should at minimum be maintained and/or possibly decreased through the improvements and decommissioning planned under the Proposed Action.

Regeneration treatments will retain Riparian Reserve width's of 440 feet on each side of stream channels along perennial fish bearing streams, and 220 foot Riparian Reserves along perennial non-fishbearing streams and intermittent streams. Commercial thinning is planned within the Riparian Reserve up to 20 feet along intermittent channels and 50 feet along portions of perennial streams. Some pathways for short-term soil displacement and sediment delivery may occur as a result of localized soil compaction and disturbance from felling, yarding, and ground based equipment operations. However, the Riparian Reserves should provide more than adequate filter strips, and there should be no delivery of sediment to water resources from these units.

The alternative includes density management within Riparian Reserves with cable systems. There should be no increase in sediment delivery, if logs are fully suspended above channels containing water. If full suspension is proven infeasible, seasonal yarding will occur to reduce the potential of soil loss into water resources. Trees felled to provide yarding corridors will also be left on site to provide a "mattress" to protect ground disturbance from partially suspended logs. There should be no effect on temperature from the reduction of crown area along channels and skyways, due to the low number, size and spacing of corridors.

Proposed Road Information
The 2.34 miles of new "semi-permanent" or "temporary" road construction should have little effect on water resources because stream channels are avoided and roads are on ridges or benches. The planned 4.23 miles of road improvement will have a slight positive effect in limiting sediment delivery due to improved drainage and surface protection. Sediment delivery may be limited or decrease from the planned 7.26 miles of road renovation, if Best Management Practices listed in the summary recommendations are followed. None of the new road construction is within Riparian Reserves, and therefore will have no effect on water quality, because Best Management Practices listed in the summary recommendations will be followed.

A net decrease of 2.1 miles of road closure by decommissioning is planned with this alternative. All new dirt and rocked construction will be fully decommissioned to pre-hydrologic condition upon completion of harvest and site preparation (in accordance with BLM hydrologist and soil scientist's recommendations). The upgrade of drainage and hydrologic function is expected to reduce the potential for road failures and sediment delivery to streams over what exists under current conditions and should have a slight positive effect on limiting sediment delivery.

Haul Route
The majority of the gravel-surface portions of the haul routes are under private control and used extensively throughout the year by private timber companies. Private use by non-timber company employees also is common during hunting and fishing seasons in the fall and winter.

Most of the haul routes are located on ridge-top with few stream crossings, and where stream crossings do occur, the ditch lines are generally well-vegetated with no indications of sediment delivery. Several intermittent and perennial stream crossings were located, through field inspection, that showed minor signs of sediment delivery during heavy rainfalls.

The private landowner controlling the roads of the haul route gave the BLM permission to place bales of straw or other sediment control devices where sediment delivery was likely to occur. The awarded contractor will place these structures before any haul can occur during the rainy season.

Impacts on Fisheries
No Action Alternative
No environmental consequences would occur under the No Action Alternative.

Proposed Action
Special Status Fish
At the time of the preparation of this EA, consultation with the National Marine Fisheries Service has not yet been completed, but will likely lead to a "may affect, not likely to adversely affect" (NLAA) determination for the Oregon coast coho salmon and the subsequent issuance of an incidental take permit. The determination of effects will also likely conclude that the proposed action conforms with the Northwest Forest Plan (Interagency 1994), the Aquatic Conservation Strategy, U.S. National Marine Fisheries Service's March 18, 1997, plan-level biological opinion, and the *Coos Bay District Resource Management Plan (RMP)* and its Record of Decision Best Management Practices (USDI BLM 1995).

No road construction work would occur in the Riparian Reserves, although yarding corridors would be created through some portions of Project Areas E and F. No timber harvest would occur in the Riparian Reserves of the regeneration harvest project areas (Project Areas A-E), although density management would occur outside of a 20 foot no-cut zone within the Riparian Reserves of Project area F and approximately 3 acres in Commercial Thinning in Project Area C.

Direct and Indirect Affects
Maintaining Riparian Reserves for all aquatic resources and potentially unstable areas in accordance with the Standards and Guidelines of the *Coos Bay District Resource Management Plan* and its Record of Decision (USDI BLM 1995) would ensure that fish, water quality, instream habitat conditions, and riparian processes are not detrimentally affected by the proposed projects. Large wood recruitment would be maintained because the effectiveness of stream side forests to deliver large wood to the channel is low at distances greater than one tree height away from the channel (FEMAT 1993). Small organic input to the streams would be maintained because most

leaf litter and other particulate matter originates within half a tree height away from a stream channel (FEMAT 1993). Although density management in Project Areas C and F would somewhat reduce the sources of organic material to the stream channels in the short-term, the long-term benefits of a better developed understory for at least 20 years and enhanced growth and development of the dominant trees should provide a greater diversity and size of organic material in the long-term (Maas 1995). An increase in the availability of large conifers, especially cedar, as a result of thinning would provide future sources of durable wood to maintain stream channel stability and provide cover for fish and other aquatic life in the long-term.

Increased sedimentation with the potential to affect fish should not occur because no activity would impact stream bank integrity, no stream crossings occur along the roads proposed to be decommissioned, and no road construction would occur within the Riparian Reserves. Water temperatures should not be affected because, in the Oregon Coast Range, riparian buffers of 100 feet or more have been reported to provide as much shade as undisturbed old growth forests (FEMAT 1993). Although density management would result in openings in the canopy in the short-term, no-cut buffers a minimum of 20 feet in width and a minimum crown closure of 60% post-thinning should not cause temperature impacts to the streams within the thinned stands.

Yarding corridors should not result in measurable effects on the aquatic or riparian systems as full or partial suspension of logs over streams would be required, corridors will be oriented perpendicular to streams, and yarding widths would be kept to a minimum. Any impacts to the Riparian Reserves is expected to be limited to the breakage of a few tree tops located adjacent to streams, which would remain on site and subsequently provided additional woody habitat for aquatic and terrestrial species.

Other than the roads identified for renovation and decommissioning as described above, the gravel-surface portions of the haul routes are under private control and used extensively throughout the year by private timber companies. Recreational use is also common during hunting seasons in the fall and winter. The Coos Bay District BLM contacted the private landowner who controls the roads on the gravel-surface portion of the proposed haul routes, and was granted permission to place sediment filters at locations where haul generated sediment delivery to fish-bearing streams of any measurable was likely to occur from roads during the rainy season (generally mid-October to mid-May). Sediment filters would be placed at locations specified by BLM if haul occurs during the rainy season. Once haul is completed, sediment retained by the filters would be transported to upland locations to prevent subsequent delivery to aquatic resources.

Cumulative Effects
Because no detrimental impacts to fish populations or their habitat are expected as a result of the proposed regeneration harvests in Project Areas A-E, no adverse cumulative effects are anticipated. However, the cumulative effects to fish populations and instream habitat as a result of density management in Riparian Reserves in Project Areas C and F are likely to be beneficial in the long-term because thinning the stand density would increase tree growth and the diversity of stand characteristics with a trend toward conditions similar to that of naturally regenerated old-growth forests.

Consistency with Aquatic Conservation Strategy Objectives
The Aquatic Conservation Strategy (ACS) was developed to restore and maintain the ecological health of watersheds and aquatic ecosystems contained within them on public lands. The strategy would protect salmon and steelhead habitat on federal lands managed by the Forest Service and BLM within the range of Pacific Ocean anadromy (USDI BLM 1995, p. B-9). The appropriate landscape scale for evaluating the consistency of individual and groups of projects with the ACS is the watershed, corresponding with the Fifth Field hydrologic unit code (Interagency 1995).

The intent of the ACS is to maintain and restore aquatic habitats and the watershed functions and processes within the natural disturbance regime by prohibiting activities that retard or prevent attainment of the ACS objectives. The primary emphasis of the Standards and Guidelines (USDI BLM 1995) for Riparian Reserves is restoration of the ecological processes and stream habitats that support riparian-dependant organisms.

The conservation strategy employs several tactics to approach the goal of maintaining the "natural" disturbance regime, but it is not possible to provide for the complete recovery of aquatic systems on federal lands within the range of the northern spotted owl within the next 100 years, and full recovery may take as long as 200 years.

Objective 1
Maintain and restore the distribution, diversity, and complexity of watershed and landscape-scale features to ensure protection of the aquatic systems to which species, populations, and communities are uniquely adapted.

The project involves regeneration harvest and commercial thinning actions on General Forest Management Area and Connectivity lands in the Cedar Creek subwatershed. Distribution, diversity, and complexity of watershed and landscape-scale features are provided by an array of land use allocations and management standards (USDI BLM 1995). The main components that provide for maintenance and restoration of watershed and landscape-scale features are the Late-Successional Reserve and Riparian Reserve networks. Other components that further contribute to this goal include designation of Key Watersheds, buffers for Protection Buffer and Survey and Manage Species, maintaining 15% of all watersheds in late successional forest condition, retaining 25-30% late successional forest in Connectivity blocks and retention of Northern spotted owl 100 acre core areas and marbled murrelet occupied sites in General Forest Management Areas.

On a finer scale, other measures will be taken when implementing this project to assure the maintenance and restoration of watershed and landscape features. In regeneration units, green trees would be retained along with course woody debris and snags. Course wood and snags also would be retained in commercial thinning units, and the increased spacing created by thinning will release minor conifer species, thereby increasing overall stand diversity and providing long-term habitat for riparian and aquatic-dependent species. The development of larger trees and a diverse understory is expected to provide greater benefits to more species.

No road construction or timber harvest would occur within Riparian Reserves that would likely degrade the aquatic systems. Because all new road construction would be semi-permanent and additional existing roads would be fully decommissioned following project completion, road density in the project area would be decreased in the long-term. The provision of yarding corridors through Riparian Reserves would result in only minor gaps in the overstory canopy and not degrade the Riparian Reserve indicator, ie. the Riparian Reserve system would continue to provide adequate shade, large woody debris recruitment, and habitat protection and connectivity.

Based on design features, the project should maintain the elements outlined in ACS Objective 1. No indicator is expected to be degraded in the Fifth Field watershed over the long term. Therefore, it is concluded this project is consistent with this ACS Objective 1.

Objective 2
Maintain and restore spatial and temporal connectivity within and between watersheds. Lateral, longitudinal, and drainage network connections include floodplains, wetlands, upslope areas, headwater tributaries, and intact refugia. These network connections must provide chemically and physically unobstructed routes to areas critical for fulfilling life history requirements of aquatic and riparian-dependent species.

No permanent roads or culverts would obstruct routes to areas critical for fulfilling life history requirements of aquatic and riparian-dependent species. The regeneration harvests would maintain the current Riparian Reserves for all aquatic resources (including headwater tributaries), providing a connected network of late successional habitat with spatial and temporal connectivity between watersheds into the future. The density management projects would retain the dominant conifer in both the Riparian Reserves and upland areas, and spacial and temporal connectivity would be maintained (canopy closure post-thinning will be approximately 65% in Project Area C, and 60% in Project Area F).

The proposed projects will meet the objectives stated in the Coos Bay District Resource Management Plan and its Record of Decision (USDI BLM 1995) of having less than 12% compaction within the harvested areas. The use of ground-based logging systems within Project Area F are located on broad, gently sloping upland areas. Some soil displacement and soil compaction can be expected, but will not affect riparian areas. No net increase in compaction is expected from ground-based logging methods in Project Area F, and the existing condition in regards to compaction is expected to be maintained. .

No known refugia would be affected by the proposed projects. No indicator is expected to be degraded in the Fifth Field watershed over the long term. Therefore, it is concluded this project is consistent with ACS Objective 2.

Objective 3
Maintain and restore the physical integrity of the aquatic system, including shorelines, banks, and bottom configurations.

The physical integrity of the aquatic system would be maintained by the Riparian Reserves established for all aquatic resources within the project area. No actions associated with the projects are likely to affect stream banks, shorelines or existing bottom configurations. Where thinning occurs within Riparian Reserves, 20 foot no-cut buffers maintained along 1st and 2nd order streams in Project Areas C and F, and 50 foot no-cut buffers along the mainstem Gooseberry Gulch Creek in Project Area F will minimize the potential for impacts to stream channels, as will full suspension over stream channels.

Ground-based logging systems in the density management stands would occur on broad gently sloping ridgetops, and not likely affect riparian areas. The design features for the project should maintain the elements outlined in ACS Objective 3.

Objective 4
Maintain and restore water quality necessary to support healthy riparian, aquatic, and wetland ecosystems. Water quality must remain within the range that maintains the biological, physical, and chemical integrity of the system and benefits survival, growth, reproduction, and migration of individuals composing aquatic and riparian communities.

The proposed projects are not likely to have a measurable effect on water temperatures or turbidity levels, or result in the release of hazardous materials. No harvest would occur in Riparian Reserves in the regeneration harvest units, and the minor canopy reduction resulting from yarding corridors should cause no measurable effects to water temperatures. The no-cut buffers, retention of the dominant trees, and post-thinning of canopy closure of at least 60% within density management Project Areas C and F should also be sufficient to prevent temperature impacts. Full-log suspension over streams will prevent damage to streambanks that could result in erosion or sedimentation. If haul occurs on gravel-surface roads during the wet seasons, sediment filters will be located where road-generated sediment would have the potential to affect aquatic and riparian communities.

Activities involving gas or diesel-powered machinery or hazardous materials in close proximity to stream channels are not likely to occur. In the event that a release of hazardous materials does occur, the contractor would be required to have a hazardous materials action plan to contain and clean-up any spills. Mechanisms would be in place to respond quickly to the incident and minimize the likelihood of contamination of a waterway.

Based on design features, the projects should maintain the elements outlined in ACS Objective 4.

Objective 5
Maintain and restore the sediment regime under which aquatic ecosystems evolved. Elements of the sediment regime include the timing, volume, rate, and character of sediment input, storage, and transport.

Implementation of Best Management Practices (USDI BLM 1995) and Project Design Features should prevent measurable increases in turbidity and fine sediment levels outside of the natural range of variability (see discussion for ACS Objective #4). Design Features to minimize road-generated sediment delivery to streams along the gravel-surface portions of the haul routes should prevent sedimentation and turbidity increases. Portions of the proposed project areas considered at high risk of landsliding would be protected as part of the Riparian Reserve network, and not influence the timing, volume, rate or character of landslide events. The elements outlined in ACS Objective 5 would be maintained, and therefore, the proposed project would be consistent with this ACS Objective.

Objective 6
Maintain and restore in-stream flows sufficient to create and sustain riparian, aquatic, and wetland habitats and to retain patterns of sediment, nutrient, and wood routing. The timing, magnitude, duration, and spatial distribution of peak, high, and low flows must be protected.

The hydrology of the area is driven by precipitation in the form of rain. The area may occasionally receive snow, but the quantity and duration of the snow does not normally produce rain-on-snow events. The projects would affect the hydrology of the streams and tributaries within the project areas for a period of 15-30 years. Increases in the annual yield, low flows, and the spring and fall peak flows are expected due to the increase in the amount of water available because of the removal of vegetation and the corresponding reduction in evapotranspiration losses during the spring and fall. However, these increased spring and fall peaks are still considerably smaller than the peaks that typically occur during large winter storms. Therefore, the increase in peak flows would not have a detrimental affect, and increases in annual and low flows may be beneficial because more water would be available during the critical low flow season. Peak, summer, and annual flows are expected to remain within the range of natural variability for these stream types at both the Fifth Field and site level scales.

Objective 7
Maintain and restore the timing, variability, and duration of floodplain inundation and water table elevation in meadows and wetlands.

The proposed actions would maintain the current Riparian Reserve network on federally administered lands. The timing, magnitude, variability and duration of floodplain inundation is expected to be maintained in the short and long term at both the site and Fifth Field watershed scales. No road construction would occur within the Riparian Reserves. Areas that are not currently connected with the floodplain would likely remain disconnected in the short-term and possibly in the long-term. No change in the current flow regime outside the range of natural variability is anticipated (see ACS Objective #6).

The design features for the proposed projects are expected to maintain the elements outlined in ACS Objective 7.

Objective 8
Maintain and restore the species composition and structural diversity of plant communities in riparian areas and wetlands to provide adequate summer and winter thermal regulation, nutrient filtering, appropriate rates of surface erosion, bank erosion, and channel migration and to supply amounts and distributions of coarse woody debris sufficient to sustain physical complexity and stability.

The current Riparian Reserve network would be maintained on federally administered lands. The proposed action would not alter any streamside vegetation that would be expected to influence stream temperature at the site or Fifth Field watershed scales in the short or long term. Thinning in the Riparian Reserves in Project Areas C and F will release minor conifer species, thereby increasing overall stand diversity and providing long-term habitat for riparian and aquatic-dependent species. The development of larger trees and a diverse understory is expected to provide greater benefits to more species. By maintaining the Riparian Reserve network, adequate summer and winter thermal regulation, nutrient filtering, appropriate rates of surface erosion, bank erosion, channel migration, and coarse woody debris recruitment are expected to be maintained on federal lands. No wetlands occur within the proposed harvest units. Therefore, it is concluded the proposed project is consistent with ACS Objective 8.

Objective 9
Maintain and restore habitat to support well-distributed populations of native plant, invertebrate, and vertebrate riparian-dependent species.

On a broad scale, the *Coos Bay District Resource Management Plan* and it Record of Decision (USDI BLM 1995) provides for the maintenance and restoration of habitat to support well distributed populations of riparian-dependent species primarily through the Late-Successional Reserve and Riparian Reserve networks. Other components that further contribute to this goal include designation of Key Watersheds, buffers for Protection Buffer and Survey and Manage Species, maintaining 15% of all watersheds in late successional forest condition, retaining 25-30% late successional forest in Connectivity blocks and retention of Northern spotted owl 100 acre core areas and marbled murrelet occupied sites in General Forest Management Areas.

The proposed action would maintain all the appropriate land allocations and management standards for the Cedar Creek subwatershed including the Riparian Reserve network. This would result in the protection of habitat to support well-distributed populations of native plant, invertebrate, and vertebrate riparian-dependent species in the short and long term. Therefore, it is concluded the proposed project would be consistent with the elements of ACS Objective 9.

Impacts on Cultural Resources and Native American Religious Concerns
No Action Alternative
No effects are anticipated from the No Action Alternative.

Proposed Action
There are no anticipated specific, direct, or indirect effects on cultural resources or Native American religious concerns from the proposed action if project design features are followed. The proposed action is not likely to expose, damage, or destroy any cultural resources.

Impacts on Solid and Hazardous Waste
No Action Alternative

No effects are anticipated from the No Action Alternative.

Proposed Action
No effects are anticipated from the proposed action, unless a release of hazardous materials occurs as a result of harvest operations. Depending upon the substance, amount, and environmental conditions in the area affected by a release, the impacts could range from minimal and short term to more extensive and longer lasting.

Minor amounts (less than 2 gallons) of diesel fuel, gasoline or hydraulic fluid leaking from heavy equipment onto a road surface, with little or no chance of migrating to surface or ground water before absorption or evaporation, would be an example of minimal impact.

If a petroleum substance is released at or above the State of Oregon reportable quantity of 42 gallons, or has the likelihood of reaching ground or surface water regardless of amount, it could cause from mild to more severe localized impact to the environment. This impact could range from localized contamination of soil and vegetation, to entry into surface water and subsequent toxic effects upon fisheries and aquatic life and /or habitat. The greater the quantity of material released, the more serious the effects are likely to be, coupled with variable conditions such as the location of the spill, seasonal water levels, flow velocity, and rainfall.

Proposed road closures will diminish the future potential for illegal dumping of solid and hazardous waste along roadsides and on landings.

The Proposed Action is subject to provisions of the Oregon Forest Practices (ODF 1998) section pertaining to Petroleum Product Precautions (OAR 629-57-3600) and Oregon Department of Environmental Quality Spills and Releases Guidelines (ODEQ 1998). BLM Administrators shall monitor and report any spills utilizing the reporting procedures in the Coos Bay District Hazardous Materials Management Contingency Plan (USDI BLM 1997).

Impacts on Soils
No Action Alternative
No affects are anticipated from this alternative.

Proposed Action
All of the new road construction will be located on ridge-tops, so the potential of erosion and sedimentation reaching the streams would be minimal. Renovation of existing roads would consist of roadside brushing, reshaping and restoring the surface where necessary, maintaining or improving drainage structures, and applying rock surfacing where needed. Rock could be obtained from the following quarries:

Buck Peak Quarry	T.27 S., R.9 W. Sec. 10
Elk Wallow Quarry	T.27 S., R.9 W. Sec. 14
Burnt Mountain Quarry	T.27 S., R.9 W. Sec. 24

Some soil erosion from cutbank sloughing and from the road surface can be expected, especially from heavy rains during the first winter following road construction, harvest and site preparation activities. Maintenance of the road will be done by either BLM or private operators under the terms of the timber sale contract. It is not anticipated that these sediments would enter the streams.

The proposed harvest units in the Cedar Creek Subwatershed Analysis Area will meet the objectives stated in the *Coos Bay District Resource Management Plan* and its Record of Decision (USDI BLM 1995) of having less than

12% compaction within the harvested areas. It is expected that the existing condition in regards to compaction will be maintained. No net increase in compaction is expected. Decommissioning of roads used for the timber sale will eliminate some of the compaction resulting from new construction. After harvest activities, installation of water bars and the removal of any culverts would be included as part of the decommissioning. Due to the very small amounts of surface runoff which occurs on these ridgetop road systems subsoiling would be of little or no benefit in restoring hydrologic function. At present, the upper 6 inches of old skid roads within the timber sale units has mostly recovered from previous timber sale activity. On the old skid trails, trees have begun to seed in and a duff layer of ½ to 1 ½ inches has developed on the surface. Below 6 inches, partial to moderate compaction is still present. Subsoiling of the old skid roads is not recommended because of the opportunity for residual root damage to occur to the trees which have grown adjacent to the skid trails. The old skid roads have naturally recovered enough that subsoiling would disturb the process that is ongoing.

Some soil displacement would be expected from yarding activities. Full log suspension when possible is preferred but partial log suspension is suitable for these areas and consistent with the Timber Production Capability Classification recommendations. Surface erosion generated during harvest or road and landing construction would travel very short distances before being trapped by duff and woody materials. Seeding and mulching of the bare soils will help minimize the impacts created by road and landing construction. To the extent possible, limbs and tops of harvested trees should be left on site to re-establish some of the organic matter displaced due to the disturbance of soils by yarding activities.

In the time frame of about 3 to 15 years following regeneration harvest, the roots of conifer stumps decay and loose strength. This, in conjunction with areas of the timber sales where the slopes exceed 35%, raises the possibility for mid-slope soil failures within the logged units. These failures usually only occur during extraordinarily heavy rainstorm events, heavy rain on snow events and when the soils are already heavily saturated. These sorts of failures are generally small in nature, result as debris avalanches, and do not travel very far. In the partial cut areas, the roots of residual trees and other vegetation provide nearly the same soil holding strength as in uncut units. Under very intense storm events, slope failures are common in unharvested forest stands throughout the coast range.

Within Project Area F, 174 acres will be harvested through the use of ground based logging systems. Some soil displacement and soil compaction can be expected but will not affect riparian areas. The units proposed for the use of ground based systems are located on broad gently sloping ridgetops. Soil displacement and compaction can be drastically reduced by traveling over the slash generated from thinning activities. Allan (1997) suggested that slash appears to protect against increased bulk densities as the number of passes increases, and wet soils may benefit more from a slash layer than dry soils. Under most circumstances, cut-to-length equipment makes fewer passes through a stand over less area than tree-length systems on a per-volume-removed basis. Another frequently cited benefit of cut-to-length systems is the manner in which the harvester lays down a mat of slash in its own path (Seixes 1995).

As well as the use of a logging system that travels on slash, the use of designated skid trails can drastically reduce the impact of ground based systems. Studies of cut-to-length system have indicated that new entries produce no significant increase in compaction to old skid trails. In the proposed ground based harvest areas, the gentle slope of the units greatly reduces the chances of transport of sediment generated from harvest activities. Any surface erosion would travel very short distances before being trapped by the duff layer and slash.

Impacts on Environmental Justice

No Action Alternative

No direct, indirect, or cumulative impacts should occur. Current laws and regulations require protection and management of public lands to provide for a wide variety of forest types and ages that support forest use and products. No substantial or disproportionately high and adverse human health, and economic or environmental effects should occur to minority, Indian tribe, or low-income populations.

Proposed Action

Direct Impacts

There are no known cultural or religious uses for these areas. Small sale permits for minor forest products cover most BLM lands open to the public and do not track site specific use areas. There are no products unique to any of these sites and past records or knowledge of area use indicate there is little use in these areas, but any particular individual currently using these sites could be directly impacted and have to use other areas. This impact would only be on an individual and not a population or minority group.

Indirect Impacts

Since different minor forest products can be associated with different stand development stages those products more often associated with an older stand would decline and those associated with stand initiation would increase. Current laws and regulations protect public lands and provide for a wide variety of forest types and ages. This variety should continue to support all types of forest use and products.

Cumulative Impacts

There should be no cumulative impacts to Environmental Justice.

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Attachment One - Soils

Soil Types

Project Area	Mapping Unit (% of Unit)	Soil Type	% Slope
A	370F	Fernhaven Gravelly Loam	3 - 30
	370F	Fernhaven Gravelly Loam	30 - 50
B	312F	Preacher-Bohannon Complex	30 - 60
	325E	Orford Gravelly Silt Loam	3 - 30
	350G	Preacher-Bohannon-Digger Complex	60 - 90
	370F	Fernhaven Gravelly Loam	30 - 50
	375F	Fernhaven-Digger Complex	30 - 60
	376G	Digger-Preacher Complex	60 - 90
C	240G	Digger-Bohannon-Umpcoos Complex	30 - 60
	325E	Orford Gravelly Silt Loam	3 - 30
	325F	Orford Gravelly Silt Loam	30 - 60
	350G	Preacher-Bohannon-Digger Complex	60 - 90
D	240G	Digger-Bohannon-Umpcoos Complex	30 - 60
	312F	Preacher-Bohannon Complex	30 - 60
	437G	Digger-Umpcoos-Rock Outcrop Association	30 - 60
E	240G	Digger-Bohannon-Umpcoos Complex	30 - 60
	312F	Preacher-Bohannon Complex	30 - 60
	325E	Orford Gravelly Silt Loam	3 - 30
	350G	Preacher-Bohannon-Digger Complex	60 - 90
F	38F	Milbury-Bohannon-Umpcoos Association	50 - 80
	46D	Preacher-Bohannon Loams	3 - 30
	46E	Preacher-Bohannon Loams	30 - 60
	46F	Preacher-Bohannon Loams	60 - 90
	58F	Umpcoos-Rock Outcrop Association	70 - 99

The soils within the Cedar Creek Subwatershed Analysis area have been rated on susceptibility to erosion when no cover is present and compaction hazard. Surface means soils generally can withstand use under most conditions. Moderate means soil properties are unfavorable for use under some conditions and should be restricted. Severe means soils are unfavorable enough that use in most instances could result in soil conditions which are very difficult to remediate. Erosion susceptibility and compaction hazard for the soils of the Cedar Creek Subwatershed Analysis area can be found in the following table:

Erosional Susceptibility & Compaction Hazard

Soil	Permeability	Erosional Susceptibility	Compaction Hazard	Slope Stability
Digger-Bohannon complex (240)	moderate to moderately rapid	severe in Digger soils and slight in slopes <10% moderate in slopes 10-35% and severe on slopes >35% on Bohannon soils	slight to moderate	severe- very unstable sideslopes on Digger soils
Preacher-Bohannon complex (312)	moderate	slight, slopes <10% mod, slopes 10-35%, severe on slopes >35%	moderate	
Orford gravelly silt loam (325)	moderately slow	slight on slopes <10% and moderate on slopes >10%	severe	
Preacher-Bohannon-Digger complex (350)	moderate to moderately rapid	severe in Digger soils and slight in slopes <10% moderate in slopes 10-35% and severe on slopes >35% on Preacher and Bohannon soils	slight to moderate	severe- very unstable sideslopes on Digger soils
Fernhaven gravelly loam (370)				
Digger-Preacher complex (375)	moderate to moderately rapid	severe in Digger soils and slight in slopes <10% moderate in slopes 10-35% and severe on slopes >35% on Bohannon soils	slight to moderate	severe- very unstable sideslopes on Digger soils
Digger-Umpcoos-Rock outcrop complex (437)	moderately rapid to variable in Rock outcrops	severe	slight	severe- very unstable sideslopes

Soil	Permeability	Erosional Susceptibility	Compaction Hazard	Slope Stability
Digger-Preacher complex (376)	moderate to moderately rapid	severe in Digger soils and slight in slopes <10% moderate in slopes 10-35% and severe on slopes >35% on Preacher soils	slight to moderate	severe- very unstable sideslopes on Digger soils
Milbury-Bohannon-Umpcoos association (38)	moderate to moderately rapid	severe in Milbury and Umpcoos soils and slight in slopes <10% moderate in slopes 10-35% and severe on slopes >35% on Bohannon soils	slight to moderate	severe- very unstable sideslopes on Umpcoos soils and severe landslide hazard with roads in headwalls being unstable in Milbury soils
Preacher-Bohannon loams (46)	moderate	slight, slopes <10% mod, slopes 10-35%, severe on slopes >35%	moderate	
Umpcoos-Rock outcrop association (58)	moderately rapid to variable in Rock outcrops	severe	slight	severe- very unstable sideslopes

Attachment Two - Survey and Manage, Protection Buffer, and Special Status Botanical Species

There are no known occurrences within the vicinity of the project areas of plant species requiring pre-disturbance surveys, which are listed in the table below.

Survey and Manage Species Whose Suspected Range Falls within the Umpqua Resource Area, Which Require Pre-Disturbance Surveys

Scientific Name	D/S*	Status	Habitat
Botrychium montanum	S	1A	Closely associated with old growth and western redcedar. Occurs in dark coniferous forests, usually near swamps or springs
Botrychium minganense	S	1A	Closely associated with old growth and western redcedar. Occurs in dark coniferous forests, usually near swamps or springs
Lobaria linita	S	1A	Mainly epiphytic in coastal Alaska to western Oregon
Platismatia lacunosa	D	1C	Moist, riparian forests where it often occurs on the upper branches of *Alnus rubra*. Also in cool, moist upland sites.
Psuedocyphellaria rainierensis	S	1A	Moist old growth forests at low to mid elevations, usually dominated by Douglas-fir and western hemlock, usually in the lower to mid canopy.
Schistostega pennata	S	1A	On damp rocks, soil or decaying wood, in dark places such as openings to mines, caves or rock crevices, etc.
Teloschistes flavicans	S	1A	coastal forests, shore pine/Sitka spruce
Tetraphis geniculata	S	1A	On well rotted stumps and logs, in shaded humid locations.

Special Status Species Whose Suspected Range Falls within the Umpqua Resource Area, Which Require Pre-Disturbance Surveys

Scientific Name	Common Name	D/S*	Status**	Habitat	Season
Cimicifuga elata	tall bugbane	S	BS, ONHP 1	Coniferous forest, north of Umpqua River, and east side of district	May-Sept.
Iliamna latibracteata	California globe mallow	S	AS, ONHP 2	moist ground and stream banks	June-Sept.
Pellaea andromedifolia	coffee-fern	D	AS, ONHP 2	rocky outcrops	All year
Polystichum californicum	California sword fern	S	AS, ONHP 2	rocky outcrops	All year
Romanzoffia thompsonii	Thompson's mist maiden	S	BS, ONHP 1	mossy covered rock outcrops	Mar.-May
Cryptomitrium tenerum	liverwort	S	AS, ONHP 2	Unknown	All year
Diplophyllum plicatum	liverwort	D	AS, ONHP 2	tree boles of *Tsuga, Thuja*	All year
Bryum calbryoides	moss	S	AS, ONHP 2	unknown	All year

Scientific Name	Common Name	D/S*	Status**	Habitat	Season
Schistostega pennata	luminous moss	S	AS, ONHP 2	on damp soils in dark places, such as root wads	All year
Cladidium bolanderi	lichen	S	AS, ONHP 2	Unknown	All year

Species and Sites Found in Project Area B for the Season Ending on 12-31-99

Species	Number of Sites
Antitrichia curtipendula (moss)	Throughout unit
Bondarzewia mesenterica (fungi)	2
Cantharellus cibarius (fungi)	Throughout unit
Cantharellus subalbidus (fungi)	2
Clavariadelphus borealis (fungi)	1
Clavariadelphus truncatus (fungi)	4
Clavulina cristata (fungi)	2
Gomphus clavatus (fungi)	1
Gomphus floccosus (fungi)	3
Helvella compressa (fungi)	1
Hydnum repandum (fungi)	Throughout unit
Lobaria oregana (lichen)	Throughout unit
Lobaria pulmonaria (lichen)	Throughout unit
Loxosporopsis corallifera (lichen)	1
Neournula pouchetii (fungi)	1
Peltigera collina (lichen)	Throughout unit
Nephroma laevigatum (lichen)	Throughout unit
Otidea onotica (fungi)	38
Phaeicollybia attenuata (fungi)	1
Phaeicollybia olivacea (fungi)	2
Phaeicollybia oregonsis (fungi)	1
Plectania melastoma (fungi)	1
Pseudocyphellaria anomala (lichen)	Throughout unit
Pseudocyphellaria anthrapsis (lichen)	Throughout unit
Pseudocyphellaria crocata (lichen)	Throughout unit
Ramaria acrisiccescens (fungi)	2
Ramaria araiospora (fungi)	3
Ramaria aurantisiccescens (fungi)	1
Ramaria cyaneigranosa (fungi)	1
Ramaria gelatiniaurantia (fungi)	8

Species	Number of Sites
Ramaria rubrievanescens (fungi)	1
Ramaria stuntzii (fungi)	1
Sticta limbata (lichen)	Throughout unit
Sarcosoma latahense	

Attachment Three - Noxious Weeds

The Noxious Weed Specialist recommends that all broom areas be treated by mechanical or hand pulling and thistles by hand pulling or keeping flower heads cut. Backpack hand spraying is also possible for the thistles. Use of watershed counsel agreements for treatment is probably the best way and requires a task order. See the Noxious Weed Specialist on how and when to implement. Remember that most sites are on private lands and we need a conditions of use agreement from the private land owner prior to any activity on their lands. This is the responsibility of the road engineer.

Project Area A
The upper private road had no weeds visible - the middle private road had sprayed broom and we hand pulled additional on 2/8/00 (2 plants were not pulled). BLM road 26-08-11.3 had a few broom and about 2/3rds were hand pulled on 2/8/00. This road will need the broom to be treated and grass seeded prior to being put to rest.

Project Area B
26-08-27.0 road has thistle at various places. Spur 27.2 past unit 1 and into unit 3 had no visible weed problem as well as the road going into unit 2 in the NW corner of section 22. The road into unit 5 was not driveable but if memory serves from previous trips there is a medium amount of scotch broom present on the private lands which should be treated. The road into unit 6 (on private lands) had 2 scotch broom plants and some bull thistles. These should be treated prior to activities.

Project Area C
No weeds were noted.

Project Area D
The roads were not accessed. At most there could be limited amounts of broom which should be treated.

Project Area E
Thistles were noted on the private lands.

Project Area F
Has some broom scattered on the main road - no other roads were checked.

Attachment Four - Mollusks

Green Cedar Mollusk Management Recommendation(s) for Project Area A (unit 7) and B (unit 1-6)

1 INCOMPLETE (needs 2nd protocol visit or passing of EIS)

2 DROPPED (16 trees and too many discoveries)

3 **Strategy 1 and 3:** PRCO (9 sites-1 ea. & 1 site includes a PRDU), PRDU (4 sites - 1 ea. & 1 site includes a PRCO), and no MEHE sites. PRCO meets locally common criteria & will be strategy 3, requiring 1 hot spot per 10 ac. surveyed (60 ac. surveyed including riparian zones = **mim. 6 hot spots**) of 1-2 ac in size totaling 10-20% of the total acreage (i.e. of 60ac. = **6 - 12ac.**). PRDU is not locally common and will be strategy 1 (i.e. buffers to maintain environmental conditions at the site-consider slope, position, aspect, moisture, down logs, hardwoods, & other elements).

Treatments * **(remember a total of 6 PRCO hotspots are needed)**	**PRCO Site #**	**PRDU Site #**
Strategy 3 - hot spot **with PRDU discovery will be buffered under PRDU P12** (there are 2 P12's be careful)	**P12**	**See PRDU P12 below ****
Strategy 3 - buffer/incorporate into RIP or could wipe out	A31	•
Strategy 3 - buffer/incorporate into RIP or could wipe out	P34	•
(PV2)		
Strategy 3 - buffer and/or could be wiped out	P3	•
Strategy 3 - hot spot include with PRDU buffers (there are 2 P12's be careful)	**P12**	******
Strategy 3 - buffer/incorporate into RIP or could wipe out	A13	•
Strategy 3 - hot spot - incorporate into RIP	**P15**	
Strategy 3 - hot spot include with PRDU buffers	**A36**	******
Strategy 3 - hot spot include with PRDU buffers	**P37**	******
Strategy 1- mim. 220' buffer, include PRCO's	**See P12 at top**	**P12 ****
Strategy 1- mim. 220' buffer, include PRCO's		**P16 ****
Strategy 1 - hot spot - incorporate into RIP		**A27**
(PV2)		
Strategy1- mim. 220' buffer, include PRCO's		**P11 ****

***** Under regen. conditions - generally a site tree potential buffer or approximation. Ground and habitat conditions determine shape/tie in's (to sites close to each other/nearby RIP buffers).

** These sites are one big clump.

• Bullets are sites that could be eliminated, disturbed, or have minimum buffer.

4 DROPPED (too small and too many discoveries)

5 **Strategy 1 and 3:** PRCO (2 sites - 1 each), PRDU (1 site - 1 each), and no MEHE sites. PRCO meets the locally common definition criteria but will be treated under strategy 1 with a combined buffer for P2 and A3. PRDU doesn't meet the locally common definition and will be treated under strategy 1 and P7 may be **connected to the RIP buffer**.

Treatments *	**PRCO Site #**	**PRDU Site #**
Strategy 1 - hot spot - tie in with **A3**	**P2**	
Strategy 1 - hot spot - tie in with **P2**	**A3**	
Strategy 1 - hot spot - incorporate into RIP		**P7**

***** Under regen. conditions generally a site tree potential buffer or approximation. Ground and habitat conditions determine shapes and tie in's (to sites close to each other/nearby RIP buffers).

6 **Strategy 3:** PRCO (14 sites - 1 site has 2 and 1 site includes a PRDU), PRDU (15 sites - 4 sites have 2 and 1 site includes a PRCO), and no MEHE sites. 110 acres surveyed - 86 acer project. The 10 acer set aside has 1 duplicate site (i.e. PRCO/PRDU at same site) plus 2 PRCO and 5 PRDU sites (2 sites have 2 PRDU's found).

Treatments * **(remember 9 each (PRCO/PRDU) hotspots are needed)**	**PRCO Site #**	**PRDU Site #**
Strategy 3 - possible RIP connection	A10	
Strategy 3 - possible RIP connection	P12	
Strategy 3 - possible RIP connection	A14	
Strategy 3 - possible RIP connection	P16	
Strategy 3 - possible RIP connection	A28a	
Strategy 3 - Hot Spot - PRCO & PRDU (see A28b below)	**A28b ****	See PRDU A28b
Strategy 3 - Hot Spot	**P53 ****	
Strategy 3 - Hot Spot	**P56 ****	
Strategy 3 - In way of logging- **eliminate** with P31/A35/P64	A66	•
(PV2)		
Strategy 3 - could eliminate	P3	•
Strategy 3 - In way of logging- **eliminate** with P31/P64/A66	A35	•
Strategy 3 - if P31/A35/P64/A66 dropped - **mark with P32**	**A40**	•
Strategy 3 - could eliminate	A41	•
Strategy 3 - In way of logging - **eliminate** with P31/A35/P66	P64 ***	•
Strategy 3 - Hot Spot - PRDU/PRCO (same as A28b above)	See PRCO A28b	**A28b ****
Strategy 3 - In way of logging- **eliminate** with A35/P64/A66	•	P31
Strategy 3 - Hot Spot - 2 PRDU's - couple with P36 below	•	P35 ***
Strategy 3 - Hot Spot - connect with P35 above	•	P36***
Strategy 3 - Hot Spot - 2 PRDU's at this site		**P54 ****
Strategy 3 - Hot Spot		**A55 ****
Strategy 3 - Hot Spot - 2 PRDU's at this site		**A57 ****
Strategy 3 - Hot Spot		**A58 ****
Strategy 3 - Hot Spot		**P60 ****
(PV2)		
Strategy 3 - depends on A23/P30	•	P20
Strategy 3 - Hot Spot (**connect to P24 below**)		**A23**
Strategy 3 - Hot Spot (**connect to A23 above**)		**P24**
Strategy 3 - Hot Spot		P25
Strategy 3 - depends on others	•	P30
Strategy 3 - if P31/A35/P64/A66 dropped-**mark with A40**	•	**P32**

***** Under regen. conditions generally site tree potential buffer or approximation. Ground/habitat conditions determine shapes and tie in's (to sites close to each other/nearby RIP buffers).

****** These sites are all on a small 10 acre piece that is set aside as a hot spot.

******* Sites with multiple discoveries, potentially good hot spot set asides.

• Bullets plus "In way logging" are sites that could be eliminated, disturbed, or have mim. buffer.

7 INCOMPLETE (needs 2nd protocol visit or passing of EIS).

Attachment Five - Hydrology

The following example illustrates expected changes in annual water yield in Cedar Creek subwatershed with the current road system.

< An additional 15-20 inches of water is expected to occur from the area occupied by the road prism.
< The average width of the unvegetated road prism is 30 feet (3.64 acres/mi).
< The total road density (BLM and private) in Cedar Creek is 6.23 mi/mi^2.
< Precipitation in Cedar Creek varies from 60-80 inches
< approximately 70% of the precipitation becomes streamflow.
< Cedar Creek subwatershed area is 54.33 mi^2.

Therefore, 3.64 $acres/mi^2$ x 6.23 mi/mi^2 x 54.33 mi^2 = 1232.05 acres/640 = 1.93 mi^2 of total road disturbance. Further, 1.93 mi^2/54.33 mi^2 = 0.0375 x 100 = 3.75% open area in Cedar Creek due to roads. If 3.75% of the watershed is contributing an average of 17.5 inches of additional water, then 3.75/100 =0.0375x17.5 inches = 0.66 inches for a watershed equal area contribution. Because average precipitation in Cedar Creek is about 70 inches and about 70% becomes runoff, then 49 inches may become annual runoff. The potential percent increase in annual yield then becomes 0.66 inches/49 inches = 0.00236 x100 = 1.35%.

Hydrologic Evaluation of Consistency with ACS Objectives

ACS OBJECTIVE 1
Due to the design features of harvest methods, stream buffers, road placement, improvements, renovation and subsequent decomisioning following the project, the Riparian Reserve system would continue to provide adequate shade, large woody debris recruitment, and habitat protection and connectivity.

Based on design features, the project is consistent with ACS Objective 1.

ACS OBJECTIVE 2
The project would maintain the current Riparian Reserves, therefore, it is concluded this project is consistent with ACS Objective 2.

ACS OBJECTIVE 3
No actions associated within the project are likely to affect stream banks, shorelines or existing bottom configurations. Therefore, this project is consistent with ACS Objective 3.

ACS OBJECTIVE 4
The proposed project is not likely to measurably effect water temperatures, stream turbidity levels, or result in the release of hazardous materials. Minor canopy reduction resulting from yarding corridors should cause no measurable effects to water temperatures. Stream buffers within Project Areas A-E and no-cut buffers and retention of the dominant trees within Project Area F should also be sufficient to prevent temperature impacts. Based on design features, the projects should maintain current water quality parameters and be consistent with ACS Objective 4.

ACS OBJECTIVE 5
Implementation of Best Management Practices and Project Design Features should prevent measurable increases in turbidity and fine sediment levels above background levels or outside of the range of natural variability. Therefore,

the proposed project would be consistent with ACS Objective 5.

ACS OBJECTIVE 6
The minor impact on hydrology and streams in the analysis area is anticipated to be only for a period of 15-30 years. However, these changes will most likely occur only on an onsite basis and detection of changes at the mouth of this Sixth Field subwatershed or even downstream on the Fifth Field scale will most likely not be detectable or outside the range of natural variability. Additionally, any increase in low flows may be beneficial because more water would be available during the critical low flow season. Therefore, the proposed project would be consistent with ACS Objective 6.

ACS OBJECTIVE 7
No change in the current flow regime outside the range of natural variability is anticipated. Therefore, the proposed project would be consistent with ACS Objective 7.

ACS OBJECTIVE 8
The current Riparian Reserve network would be maintained on federally administered lands. Therefore, the proposed project is consistent with ACS Objective 8.

ACS OBJECTIVE 9
The proposed actions would maintain the current Riparian Reserve network and protect habitat to support riparian-dependent species. Therefore, the proposed projects would be consistent with ACS Objective 9.

Cumulative Affects:
In summary, the proposed action appears to be of sound design, and will have little effect on water resources when implemented to design features listed in the EA and if the BMP's listed in the summary recommendations are followed. Overall watershed condition will continue to improve.

Summary Recommendations for the Proposed Action

- For density management units in Riparian Reserves, fully suspend logs over channels where feasible, to protect bank stability. Where full suspension is not feasible, use seasonal restrictions.

- New road construction without rock surface that may have the potential to deliver sediment to stream channels should be storm proofed by mid-October if planned to be used the following year. Storm proofing means mulching at a minimum of 2000 lbs./ac, using wood chips or straw, and seeding with a district approved erosion control seed mix.

- Contain any offsite movement of sediment from the road or ditch flow near streams with silt fence or sediment entrapping blankets or straw bales, if haul occurs during the rainy season (mid-October to mid-May). Such control measures must allow for the free passage of water without detention or plugging. These control structures and applications should receive frequent maintenance, and be removed at the completion of haul, with sediment retained by the filters to be transported to an upland location to prevent subsequent delivery to aquatic resources. (locations specified by BLM hydrologist or fisheries biologist).

S. If logging corridors are needed through Riparian Reserves, consider emplacing log material in stream channels with cable systems, coincident with density thinning units, where determined beneficial by fisheries and hydrology specialists. This action would relate to ACS goal #5. This action may be difficult to implement under current contract specifications.

Attachment Six - Vegetation: Commercial Thinning

The following summarizes some of the benefits expected to be derived from thinning:

- Thinning results is several significant changes in tree structure and vigor: larger stem diameters, longer and wider live crowns, less cylindrical stem form (reduced height: diameter ratio), and enhanced tree vigor (faster growth and healthier physiological condition) (Maquire 1996).

- The preliminary findings is a study in the Coquille watershed indicate that commercial thinning can produce 40 inch dbh Douglas-fir and 20 inch dbh snags in half the time of that in an unthinned stand (Gregory 1995).

- Commercial thinning has the potential for maintaining a high degree of species diversity, growing large trees and encouraging merchantable wood production at advanced ages, thereby providing some elements of late successional forest ecosystems (Spies 1991)

.

- Understory cover of species like salal, bracken fern, vine maple, hazel, and oceanspray increase after thinning (Tappeiner 1999).

- Thinning in young and managed mature forests could help to create Marbled murrelet habitat in the long term by accelerating tree growth, increasing branch diameter, and creating large tree crowns (Nelson 1997)

- Thinning young stands promotes biological diversity. Bailey et al. (1998) found that plant species diversity was greater in thinned stands than in old growth and unthinned stands, and thinned stands had all the vascular plants found in old-growth stands (Tappeiner 1999).

- Natural regeneration of conifer seedlings is common after thinning. These seedlings have the potential to produce a multi-layered stand. However, in many stands additional reduction of the overstory will be needed for them to survive and grow into multiple layers. Intermediate trees and saplings (2 to 4m tall) left after thinning may form a midstory between the shrubs and larger overstory trees (Tappeiner 1999).

Gregory, S. 1995. Field Presentations: Ecosystem Structure and Management Workshop. October 1995.

Maquire, D. 1996. Commercial Thinning and Tree Growth. Oregon State University Forest Resources Department. Corvallis, Oregon.

Nelson, S. K. 1997. Marbled Murrelets and Thinning. Research Wildlife Biologist and Senior Research Assisstant, Oregon Cooperative Wildlife Research Unit. Oregon State University Department of Fisheries and Wildlife. Corvallis, Oregon.

Spies, Tappeiner, Pojar and Coates. 1991. Trends in Ecosystem Management at the Stand Level. Transcripts from the 56th North Amenrican Wildlife and Natural Resources Conference, page 32.

Tappeiner, John C. 1999. Thinning Young Stands and Biological Diversity. Forest and Rangeland Ecosystem Science Center. Oregon State University. Corvallis, Oregon.

Attachment Seven - Wildlife

Special Status Species that are known to occur or could potentially occur in the Cedar Creek subwatershed proposed timber sale units or their vicinity.

Scientific Name	Common Name	Status[1] Federal	State
Birds			
Strix occidentalis caurina	Northern Spotted Owl	FT	ST
Brachyramphus marmoratus marmoratus	Marbled Murrelet	FT	ST
Haliaeetus leucocephalus	Bald Eagle	FT	ST
Glaucidium gnoma	Northern Pygmy Owl	BT	SSU
Falco peregrinus anatum	American Peregrine Falcon	BS	
Accipiter gentilis	Northern Goshawk	BS	SSC
Aegolius acadicus	Northern Saw-whet Owl	BA	--
Selasphorus sasin	Allen's Hummingbird	BT	–
Sialia mexicana	Western bluebird	BA	SSV
Dryocopus pileatus	Pileated Woodpecker	BA	SSV
Mammals			
Corynorhinus townsendii townsendii	Pacific Western Big-Eared Bat	BS	SSC
Myotis thysanodes	Fringed Myotis	BS	SSV
Myotis evotis	Long-eared Bat	BT	SSU
Myotis volans	Long-legged Myotis	BT	SSU
Lasionycterus noctivagans	Silver-haired Bat	BT	SSU
Myotis yumanensis	Yuma Myotis	BT	SSU
Bassariscus astutus	Ringtail	BT	SSU
Arborimus albipes	White-Footed Vole	BS	SSU
Sciurus griseus	Western Gray Squirrel	BT	SSU
Martes americana	American Marten	BA	SSV
Amphibians			
Rhyacotriton variegatus	Southern Torrent Salamander	BT	SSC
Aneides ferreus	Clouded Salamander	BT	SSU
Plethodon elogatus	Del Norte Salamander	BS	SSV
Bufo boreas	Western Toad	BT	SSV
Ascaphus truei	Tailed Frog	BA	SSV
Rana boylii	Foothill Yellow Legged Frog	BS	SSV
Rana aurora aurora	Northern Red-Legged Frog	BS	SSU
Reptiles			
Contia tenuis	Sharptail Snake	BA	SSV
Clemmys marmorata marmorata	Northwestern Pond Turtle	BS	SSC

Abbreviations used in this table:
Federal Categories are: FT = Federal Threatened
BLM Categories are: BS = Bureau Sensitive species ,
BA = Bureau Assessment species, BT = Bureau Tracking species

Bureau Sensitive Species - In Oregon, these are taxa which are eligible for federal listed, federal candidate, or state listed status. These taxa are from the Oregon Sensitive Species-Critical list and/or Oregon Natural Heritage Program (ONHP) List 1.

Bureau Assessment Species - Species not included as FT, FE, FP, FC, State Listed or BS which are on the ONHP List 2.

Bureau Tracking Species - Taxa not included as FT, FE, FP, FC, State Listed, BS or BA which are State Sensitive (Vulnerable, Peripheral or Naturally Rare, or Status Undetermined) or on ONHP List 3 or 4.

State Categories are: **ST = State Threatened,** SSC = State Sensitive- Critical, SSV = State Sensitive- Vulnerable, SSU = State Sensitive- Undetermined Status

State Sensitive-Critical (SSC) - Species for which listing as threatened or endangered is pending; or those for which listing as threatened or endangered may be appropriate if immediate conservation actions are not taken. Also considered critical are some peripheral species which are at risk throughout their range, and some disjunct populations.

State Sensitive Vulnerable (SSV) - Species for which listing as threatened or endangered is not believed to be imminent and can be avoided through continued or expanded use of adequate protective measures and monitoring. In some cases the population is sustainable, and protective measures are being implemented; in others, the populations may be declining and improved protective measures are needed to maintain sustainable populations over time.

State Sensitive Undetermined Status (SSU) - Animals in this category are species for which status is unclear. They may be susceptible to population decline of sufficient magnitude that they could qualify for endangered, threatened, critical or vulnerable status, but scientific study will be required before a judgement can be made.